HIGHLIGHTS

REVISION NO. 33 Jun 01/10

Pages which have been revised are outlined below, together with the Highlights of the Revision

CH/SE/SU C PAGES	REASON FOR CHANGE	EFFECTIVITY
CHAPTER 21		
L.E.P. 1- 6	Revised to Reflect this revision indicating new,revised, and/or deleted pages	
T. OF C. 2, 5- 12	Revised to reflect this revision	
21-11-12 405- 406	Reprinted	
21-20-11 601- 603	Layout Improved or Effectivity Updated	
21-21-15 701	Minor additions and amplification **DELETED MPD CROSS-REFERENCE**	
21-22-00 11, 13- 14	Effectivity updated at the bottom of the page Deletion of the mention Post SB 24-2067 03 **ELECTRICAL POWER - MODIFY AC POWER LOAD DISTR IBUTION FOR 50A C/B'S 1XN, 2XN, 4XN**	
21-22-12 201- 208	Layout Improved or Effectivity Updated	
21-22-12 601, 604- 606	Layout Improved or Effectivity Updated	
21-23-00 503- 504	Minor, non technical corrections **REVISED RESULT OF FLOW LEGEND ON EXTRACT PUSHBUTTON SWITCH**	
21-23-13 401- 406	Minor additions and amplification **ADDED SEAL**	
21-27-00 503	Layout Improved or Effectivity Updated	
21-27-00	Layout Improved or Effectivity Updated	

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CH/SE/SU C PAGES	REASON FOR CHANGE	EFFECTIVITY
701, 704-706		
21-31-12 903- 907	Reprinted	
21-31-19 401- 403	Minor additions and amplification **ADDED STEPS AND UPDATED ITEMS RELATED TO ILLUSTRATION**	
21-51-16 301, 303	Minor additions and amplification **ADDED MATERIALS 11-507, 11-513 AND 11-514**	
21-51-35 502- 503	Minor additions and amplification **REVISED STEP SEQUENCE**	
21-55-00 501	Minor additions and amplification **REVISED TITLE**	
21-55-13 401	Layout Improved or Effectivity Updated	
21-62-12 401, 403	Minor additions and amplification **ADDED NOTE TO TELL THAT PROCEDURE IS APPLICABLE FOR BOTH HOT AIR MANIFOLD VALVES**	
21-62-14 401, 403	Minor, non technical corrections **ADDED CROSS-REFERENCE** Minor additions and amplification **ADDED OPERATIONAL TEST OF OVERHEAT WARNING SYSTEM**	

CHAPTER 21

AIR CONDITIONING

LIST OF EFFECTIVE PAGES

N, R or D indicates pages which are New, Revised or Deleted respectively
Remove and insert the affected pages and complete the Record of Revisions and the Record of Temporary Revisions as necessary

CH/SE/SU	C	PAGE	DATE
RECORD			
OF TEMP.			
REVISION			
L.E.P.	R	1- 6	Jun01/10
T. of C.		1	Jun01/09
T. of C.	R	2	Jun01/10
T. of C.		3	Jun01/09
T. of C.		4	Jun01/09
T. of C.	R	5	Jun01/10
T. of C.	R	6	Jun01/10
T. of C.	R	7	Jun01/10
T. of C.	R	8	Jun01/10
T. of C.	R	9	Jun01/10
T. of C.	R	10	Jun01/10
T. of C.	R	11	Jun01/10
T. of C.	R	12	Jun01/10
21-00-00		1	Jun01/02
21-00-00		2	Dec01/90
21-00-00		3	Jun01/02
21-00-00		4	Jun01/04
21-00-00		5	Jun01/04
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21-21-11		404	Jun01/08
21-21-12		401	Jun01/04

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CH/SE/SU	C	PAGE	DATE
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21-51-00		11	Dec01/90

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AIR CONDITIONING

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Outflow Valves			11	ALL
Safety Valves			14	ALL
Automatic Controllers			16	ALL
Controls and Indicators			18	ALL

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SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Operation			26	ALL
Operation			28	ALL
Adjustment/Test			501	ALL
Operational Test			501	ALL
Test of Automatic System Controls			502	ALL
Test of Ditching Configuration			503	ALL
Test of Outflow Valves Manual Control			505	ALL
Test of Prepressurization and Depressurization Electrical Sequences			506	ALL
Test of Cabin Pressure Outflow Valves Opening			506	ALL
Test of Cabin Pressure Controller			507	ALL
Test of Cabin Pressure Control			509	ALL
Functional Test			510	ALL
CABIN PRESSURE CONTROLLER 105HM (106HM)	21-31-11			
Removal/Installation			401	ALL
Deactivation/Reactivation			901	ALL
Ref. : MEL Sect. 1-21, Item 29			901	ALL
(Cabin pressure automatic control systems)			901	ALL
Deactivation			901	ALL
Deactivation/Reactivation			902	ALL
Ref. MMEL 21-31-02 (FAA only)			902	ALL
Deactivation			902	ALL
CABIN PRESSURE OUTFLOW VALVE	21-31-12			
Servicing			301	ALL
Removal/Installation			401	ALL
Outflow Valve Control Box			401	ALL
Outflow Valve Reduction Gearbox/ Motor Assembly			403	ALL
Cabin Pressure Outflow Valve			405	ALL
Deactivation/Reactivation			901	ALL
Ref. MMEL Sect. 1-21, Item 31			901	ALL
(Cabin Pressure Outflow Valves)				
Ref. MMEL 21-31-04 (FAA only)			903	ALL
Deactivation			903	ALL
Ref. MMEL 21-51-01 (FAA only)			905	ALL
Deactivation			905	ALL
Reactivation			906	ALL
SELECTOR - LANDING ELEVATION (104HM)	21-31-13			
Removal/Installation			401	ALL
CABIN PRESSURE SAFETY VALVE 204HM (205HM)	21-31-15			
Removal/Installation			401	ALL
Adjustment/Test			501	ALL
Operational Test			501	ALL
Functional Test			503	ALL
Inspection/Check			601	ALL
CABIN PRESS OUTFLOW VALVE POSITION INDICATOR 200HM(201HM)	21-31-16			

SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Removal/Installation			401	ALL
CABIN ALTIMETER 41HM	21-31-17			
Removal/Installation			401	ALL
CABIN VERTICAL SPEED INDICATOR 42HM	21-31-18			
Removal/Installation			401	ALL
CABIN DIFFERENTIAL PRESSURE INDICATOR 43HM	21-31-19			
Removal/Installation			401	ALL
COOLING	21-50-00			
Description and Operation			1	ALL
AIR COOLING SYSTEM	21-51-00			
Description and Operation			1	ALL
General			1	ALL
Description			6	ALL
Component Description			6	ALL
Refrigeration Unit Pack			6	ALL
Air cycle machine			6	ALL
Fan bypass check valve			11	ALL
Heat Exchanger			11	ALL
Water Injector			11	ALL
Anti Ice Screen			15	ALL
Cold Air Manifold Check Valve			15	ALL
Deflect Door Actuator			15	ALL
Operation			18	ALL
Servicing			301	ALL
Adjustment/Test			501	ALL
Operational Test			501	ALL
Inspection/Check			601	ALL
ANTI ICE SCREEN A029 (B029)	21-51-13			
Removal/Installation			401	ALL
WATER INJECTOR A031 (B031) (C031) (D031)	21-51-14			
Removal/Installation			401	ALL
COLD AIR MANIFOLD CHECK VALVE A016 (B016)	21-51-15			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
WATER SEPARATOR A015 (B015)	21-51-16			
Servicing			301	ALL
Removal/Installation			401	ALL
REFRIGERATION UNIT PACK	21-51-21			
Removal/Installation			401	ALL
COOLING TURBINE	21-51-23			
Removal/Installation			401	ALL
ANTI ICE VALVE	21-51-24			
Removal/Installation			401	ALL
COMPRESSOR BYPASS CHECK VALVE	21-51-25			
Removal/Installation			401	ALL
COMPRESSOR DISCHARGE OVERTEMPERATURE FUSIBLE PLUG	21-51-26			
Removal/Installation			401	ALL

SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
TURBINE INLET OVERTEMPERATURE FUSIBLE PLUG	21-51-27			
Removal/Installation			401	ALL
COMPRESSOR DISCHARGE PNEUMATIC THERMOSTAT	21-51-28			
Removal/Installation			401	ALL
TURBINE INLET PNEUMATIC THERMOSTAT	21-51-29			
Removal/Installation			401	ALL
FAN BYPASS CHECK VALVE	21-51-31			
Removal/Installation			401	ALL
HEAT EXCHANGER	21-51-32			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
PACK DEFLECT DOOR ACTUATOR 9HW (10HW)	21-51-35			
Removal/Installation			401	ALL
Adjustment/Test			501	ALL
Operational Test			501	ALL
Deactivation/Reactivation			901	ALL
Ref. : MEL Sect. 1-21, Item 2a			901	ALL
HEAT EXCHANGER INLET CONNECTOR	21-51-36			
Removal/Installation			401	ALL
EMERGENCY RAM AIR INLET	21-53-00			
Description and Operation			1	ALL
General			1	ALL
Description			4	ALL
Emergency Ram Air Inlet Actuator 7HZ			4	ALL
Check Valve			4	ALL
Operation			4	ALL
Adjustment/Test			501	ALL
Operational Test			501	ALL
Inspection/Check			601	ALL
EMERGENCY RAM AIR INLET ACTUATOR (7HZ)	21-53-11			
Removal/Installation			401	ALL
EMERGENCY RAM AIR INLET CHECK VALVE (0038)	21-53-12			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
GROUND COOLING	21-55-00			
Description and Operation			1	001-100,
General			1	001-100,
Component Location			1	001-100,
Description			5	001-100,
Component Description			5	001-100,
Ground Cooling Unit 21HD			5	001-100,
Ground Cooling Fan 3HD			11	001-100,
Ground Cooling Valve 22HD			13	001-100,
Airflow Detector 18HD			13	001-100,
Operation			13	001-100,
Adjustment/Test			501	001-100,

SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Operational Test			501	001-100,
GROUND COOLING UNIT 21HD	21-55-11			
Removal/Installation			401	001-100,
Removal/Installation of Electronic Control Box			404	006-100,
GROUND COOLING UNIT FAN 3HD	21-55-12			
Removal/Installation			401	001-100,
GROUND COOLING VALVE	21-55-13			
Removal/Installation			401	001-100,
Deactivation/Reactivation			901	001-100,
Ref.: MEL Sect. 1-21, item 27			901	001-100,
Deactivation			901	001-100,
Reactivation			901	001-100,
GROUND COOLING AIRFLOW DETECTOR 18HD	21-55-14			
Removal/Installation			401	001-100,
TEMPERATURE CONTROL	21-60-00			
Description and Operation			1	ALL
PACK TEMPERATURE CONTROL	21-61-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
Description			1	ALL
Component Description			6	ALL
Ram/Turbine Bypass Valve Actuator 17HH (16HH)			6	ALL
Turbine Bypass Valve 19WV (18WV)			6	ALL
Pack Discharge Temperature Control Sensor 15HH (14HH)			11	ALL
APU and Pack Temperature Demand Controller 37HK			13	ALL
Pack Temperature Controller 11HH (10HH)			16	ALL
Turbine Inlet Temperature Sensor 21WV (20WV)			19	ALL
Pack Discharge Temperature Sensor 23WV (22WV)			19	ALL
Operation			19	ALL
Adjustment/Test			501	ALL
Operational Test			501	ALL
Deactivation/Reactivation			901	ALL
Deactivation			901	ALL
Reactivation			904	ALL
TURBINE BYPASS VALVE 19WV (18WV)	21-61-11			
Removal/Installation			401	ALL
Deactivation/Reactivation			901	ALL
Ref. : MEL Sect. 1.21-1 (Air conditioning packs)			901	ALL
Deactivation			901	ALL
Reactivation			903	ALL
RAM/TURBINE BYPASS VALVE ACTUATOR 17HH (16HH)	21-61-13			

SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Removal/Installation			401	ALL
Deactivation/Reactivation			901	ALL
Ref. : MEL Sect. 1-21, 2b (regulator flap/turbine by-pass valve actuation)			901	ALL
Deactivation			901	ALL
Reactivation			903	ALL
TURBINE BYPASS VALVE FLEXIBLE CONTROL	21-61-14			
Removal/Installation			401	ALL
PACK TEMPERATURE CONTROLLER 11HH (10HH)	21-61-15			
Removal/Installation			401	ALL
APU AND PACK TEMPERATURE DEMAND CONTROLLER 37HK	21-61-16			
Removal/Installation			401	ALL
PACK DISCHARGE TEMPERATURE CONTROL SENSOR 15 HH (14 HH)	21-61-17			
Removal/Installation			401	ALL
PACK DISCHARGE TEMPERATURE SENSOR 23WV (22WV)	21-61-18			
Removal/Installation			401	ALL
TURBINE INLET TEMPERATURE SENSOR 21WV (20WV)	21-61-19			
Removal/Installation			401	ALL
RAM AIR OUTLET FLAP	21-61-20			
Removal/Installation			401	ALL
TRIM AIR CONTROL AND OVERHEAT MONITORING	21-62-00			
Description and Operation			1	ALL
General			1	ALL
Description			1	ALL
Component Description			6	ALL
Hot Air Supply Valve 11HJ			6	ALL
Hot Air Manifold Check Valve			11	ALL
Hot Air Manifold Pressure Switch 13HJ			11	ALL
Inlet Duct Thermal Switches 7HJ, 8HJ, 9HJ and 10HJ			11	ALL
Operation			11	ALL
Adjustment/Test			501	ALL
Operational test			501	ALL
HOT AIR SUPPLY VALVE 11HJ	21-62-11			
Removal/Installation			401	ALL
Deactivation/reactivation			901	ALL
Ref. : MEL Sect. 1.21, item 13			901	ALL
Deactivation			901	ALL
Reactivation			903	ALL
HOT AIR MANIFOLD CHECK VALVE	21-62-12			
Removal/Installation			401	ALL
Inspection/Check			601	ALL
HOT AIR MANIFOLD PRESSURE SWITCH 13HJ	21-62-13			
Removal/Installation			401	ALL
INLET DUCT THERMAL SWITCH 7HJ (8HJ,	21-62-14			

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SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
9HJ, 10HJ)				
Removal/Installation			401	ALL
FLIGHT COMPARTMENT AND CABIN TEMPERATURE CONTROL	21-63-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
Description			8	ALL
Component Description			14	ALL
Trim Air Valve 25HK (26HK, 27HK, 28HK)			14	ALL
Temperature Controller 17HK (18HK, 19HK, 20HK)			14	ALL
Temperature Selector 13HK (14HK, 15HK, 16HK)			16	ALL
Zone Inlet Temperature Control Sensor 29HK (30HK, 31HK, 32HK)			16	ALL
Zone Ambient Temperature Control Sensor 33HK (34HK, 35HK, 36HK)			16	ALL
Zone Duct Temperature Sensor 67HK (68HK, 69HK, 70HK, 23HN)			20	ALL
Zone Ambient Temperature Sensor 62HK (64HK, 65HK, 66HK, 39HN)			20	001-100,
COMPT/DUCT Temperature Indicator 55HK			20	001-100,
Zone Ambient Temperature Sensor 62HK (64HK, 65HK, 66HK, 39HN)			20	101-200,
COMPT/DUCT Temperature Indicator 55HK			20	101-200,
Servicing			301	ALL
Adjustment/Test			501	ALL
Operational Test			501	ALL
Manual Temperature Control Test			501	ALL
Automatic Temperature Control Test			502	ALL
ZONE TEMPERATURE CONTROLLER 19HK (17HK) (18HK) (20HK)	21-63-11			
Removal/Installation			401	ALL
TRIM AIR VALVE	21-63-12			
Removal/Installation			401	ALL
COCKPIT Trim Air Valve 25HK			401	ALL
Cabin Trim Air Valve 26HK, (27HK), (28HK)			404	ALL
Deactivation/Reactivation			901	ALL
Ref. : MEL Sect. 1-21, item 15 (Temperature control valves (cockpit + cabin))			901	ALL
Deactivation			901	ALL
Reactivation			904	ALL
ZONE INLET TEMPERATURE CONTROL SENSOR	21-63-16			

SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
29HK (30HK, 31HK, 32HK)				
Removal/Installation			401	ALL
AMBIENT TEMPERATURE CONTROL SENSOR 33HK (34HK) (35HK) (36KH)	21-63-17			
Removal/Installation			401	ALL
ZONE DUCT TEMPERATURE SENSOR 67HK, (68HK), (69HK), (70HK)	21-63-18			
Removal/Installation			401	ALL
AMBIENT TEMPERATURE SENSOR 65HK (66HK) (62HK) (64HK)	21-63-19			
Removal/Installation			401	ALL
CARGO COMPARTMENT TEMPERATURE CONTROL	21-64-00			
Description and Operation			1	ALL
General			1	ALL
Component Location			1	ALL
System Description			8	ALL
Component Description			16	ALL
Controls and Indicators			26	ALL
System Operation			28	ALL
Activation			28	ALL
Temperature Control - Auto/Man			28	ALL
Deactivation - Normal/Emergency			33	ALL
Servicing			301	ALL
Adjustment/Test			501	ALL
Operational Test			501	ALL
Isolation Valve, Extraction Fan and MFA			502	ALL
BITE-Test			504	ALL
Smoke Det Interface - BULK Compt			505	101-200,
Smoke Det Interface - BULK Compt			506	001-100,
DUCT TEMPERATURE MONITORS	21-64-11			
Removal/Installation			401	ALL
COMPARTMENT TEMPERATURE MONITORS 22HN, 39HN	21-64-12			
Removal/Installation			401	ALL
CARGO COMPARTMENT TEMPERATURE CONTROLLER 54 HN	21-64-13			
Removal/Installation			401	ALL
CHECK VALVE 0518	21-64-15			
Removal/Installation			401	ALL
TRIM AIR VALVES 20HN	21-64-32			
Removal/Installation			401	ALL
Deactivation/Reactivation			901	ALL
Ref. MMEL Sect. 1.21 item 23 (Trim air valve (cargo))			901	ALL
EXTRACTION FAN 30HN	21-64-33			
Removal/Installation			401	ALL
ISOLATION VALVE 19HN	21-64-34			
Removal/Installation			401	ALL
Valve/Actuator Assembly			401	ALL
Actuator			405	ALL

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SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
Deactivation/Reactivation			901	ALL
Ref. MMEL Sect. 1.21 item 21 (ISOL VALVE)			901	ALL
MOISTURE/AIR CONTAMINANT CONTROL	21-70-00			
Description and Operation			1	101-200,
OZONE REDUCING SYSTEM	21-71-00			
Description and Operation			1	101-200,
OZONE REDUCER	21-71-11			
Removal/Installation			401	101-200,
Inspection/Check			601	101-200,

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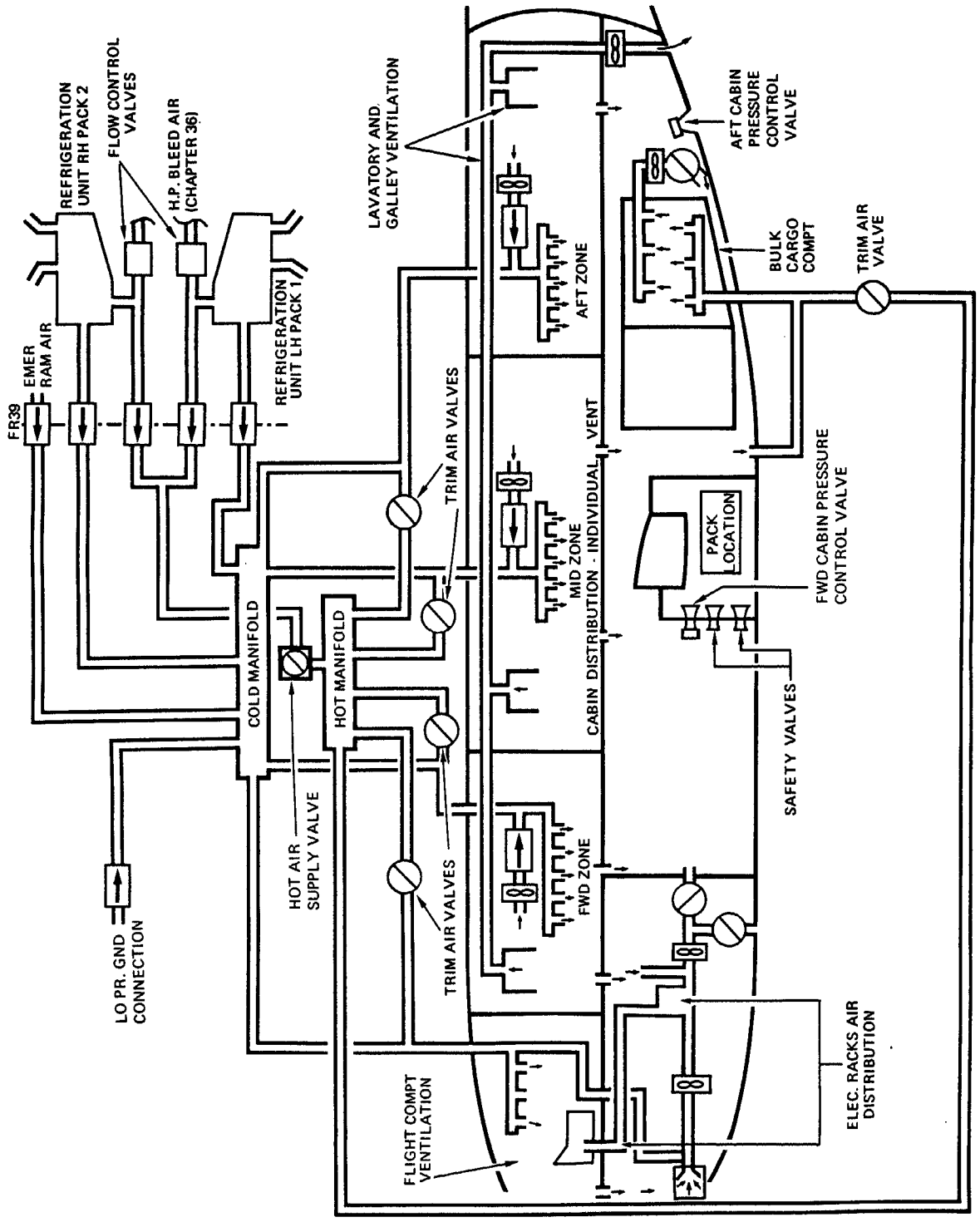
1. General

The air conditioning system is designed to maintain the air within the pressurized fuselage compartments at the desired levels of pressure, temperature and freshness. Under normal conditions, air is supplied to the system by the main engine compressors, the APU load compressor, or a ground high pressure air supply unit. This hot compressed air is cooled, conditioned and distributed to the various fuselage compartments and then discharged overboard through automatic pressure regulating valves. Conditioned air can also be supplied direct to the air distribution system by a low pressure ground connection. A ram air inlet is provided for emergency provision of fresh air ventilation in flight should the refrigeration units (Packs) fail.

(Ref. Fig. 001)

R (Ref. Fig. 002)



General System Layout
Figure 001

BM6 21 00 00 0 AAN0 00

AIR FLOW RATES (1) AND VOLUMES

A310	VOLUME		2 PACKS NORM		2 PACKS ECON		1 PACK (FAILURE CASE)	
COCKPIT	12 m^3	FRESH AIR FLOW (kg/s)	0.194		0.160		0.140	
		RECIRC. AIR FLOW (kg/s)	0		0		0	
		FRESH AIR EXCHANGE RATE (1/h)	66.0		54.4		47.6	
		TOTAL AIR EXCHANGE RATE(1/h) (2)	66.0		54.4		47.6	
CABIN	244 m^3 (3)	FRESH AIR FLOW (kg/s)	1.325		0.848		0.580	
		RECIRC. AIR FLOW (kg/s)	0.847		0.983		1.047	
		RECIRC. FLOW RATIO (%)	39		54		64	
		FRESH AIR CABIN EXCHANGE RATE (1/h)	22.2		14.2		9.7	
		TOTAL AIR CABIN EXCHANGE RATE(1/h)	36.3		30.6		27.2	
		NUMBER OF OCCUPANTS (5)	240+7		160+7 (4)		240+7	
		FRESH AIR PER OCCUPANT (l/s)/(cfm)	6.08	12.89	5.76 (4)	12.21 (4)	2.66	05.64
		TOTAL AIR PER OCCUPANT (l/s)/(cfm)	9.97	21.14	12.43 (4)	26.35 (4)	7.47	15.83
CARGO	FWD: 55.0 m^3	TOTAL FLOW (kg/s)	0.202		0.202		0.202	
	AFT: 38.2 m^3	TOTAL FLOW (kg/s)	./.		./.		./.	
	BULK: 21.0 m^3	TOTAL FLOW (kg/s)	0.104		0.104		0.104	
AVIONICS	N.A.	TOTAL FLOW (kg/s)	0.181		0.149		0.130	

NOTE:
(1) ALL VALUES APPLY TO CRUISE AT FL390 AND 24°C CABIN/CARGO TEMPERATURE
(2) TOTAL AIR FLOW=FRESH AIR FLOW+RECIRCULATED AIR FLOW
(3) FURNISHED CABIN VOLUME: CROWN AREA, HATTRACKS, PASSENGERS, SEATS, STOWAGES, LAVATORIES AND GALLEYS ARE CONSIDERED AS NOT VENTILATED
(4) 67% CABIN SEAT LOAD FACTOR (FCOM: 2.02.02)
(5) STANDARD LAYOUT

Air Flow Rates and Volumes
Figure 002

R

EFFECTIVITY: ALL

PIA

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2. Air Conditioning System Controls and Indicators

R **ON A/C 101-200,

(Ref. Fig. 003)

R **ON A/C 001-100,

(Ref. Fig. 004)

R **ON A/C ALL

A. Cockpit Panel Layout

(1)General

The air conditioning system controls and indicators are laid out at three locations within the cockpit as follows:

- Overhead panel, contains the system instruments required for flight.
- Maintenance panel, contains the system instruments needed for maintenance operations.
- Main instrument panel, contains the ECAM system Cathode Ray Tube (CRT) displays for the System function and Warnings.

(2)Overhead Panel

The philosophy of switching, on this panel, is pushbutton type wherever practical, with the 'normal' function being in the defined position. Any other 'abnormal' function requires the appropriate button to be released, and these 'abnormal' functions are indicated by illuminated legends within the switch itself. Indicators with flow bars (e.g. PACK VALVE 1) show a line illuminated green when the appropriate circuit has continuity indicating, as in the example, that the valve is open.

(3)Maintenance Panel

This panel is primarily intended to be used by maintenance personnel as an assistance in the performance of system maintenance. Normally only component condition memory indicator lights are installed. The memory indicators are illuminated if the maintenance panel switch ANN LT is in the READ position and if a signal has been stored.

(4)Main Instrument Panel

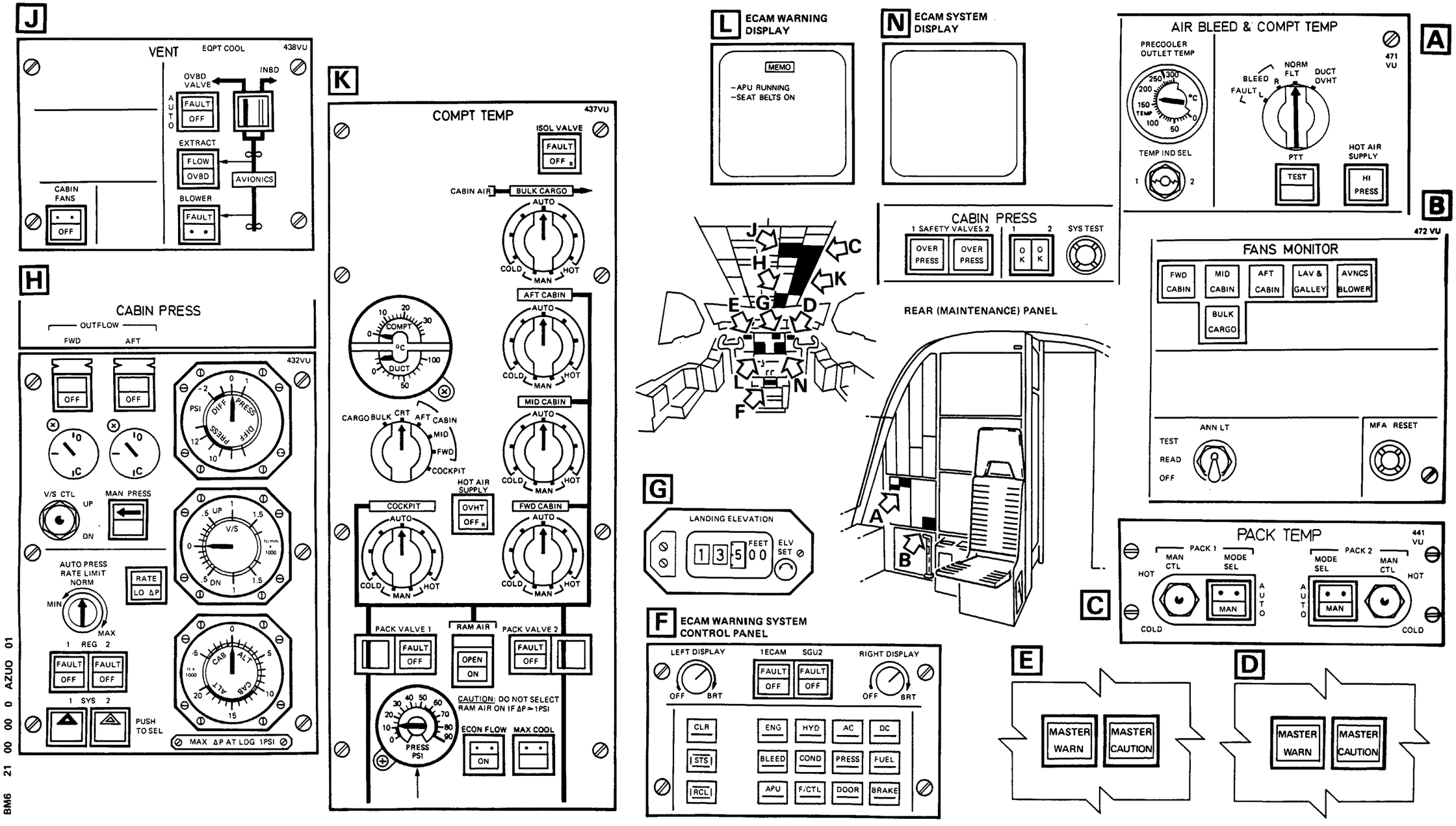
The cathode ray tube (CRT) displays for the air conditioning system (and others) are intended to follow the following basic form:

- the System is normally shown in green, with any warnings or failures shown in amber or red.
- the System display shall be as close as possible to the actual aircraft system architecture.

Three different displays are used to show the entire air conditioning system; AIR BLEED, AIR COND and CAB PRESS. A fourth display (CRUISE), showing a general system status, appears on the System CRT when no other display is selected.

Pressure control instruments also located on the main instrument panel are the landing altitude selector and the main altimeters.

3. System Electrical Power Supply



BM6 21 00 00 0 AZUO 01

General Controls and Indicators Location
Figure 003

R

R EFFECTIVITY: 101-200,

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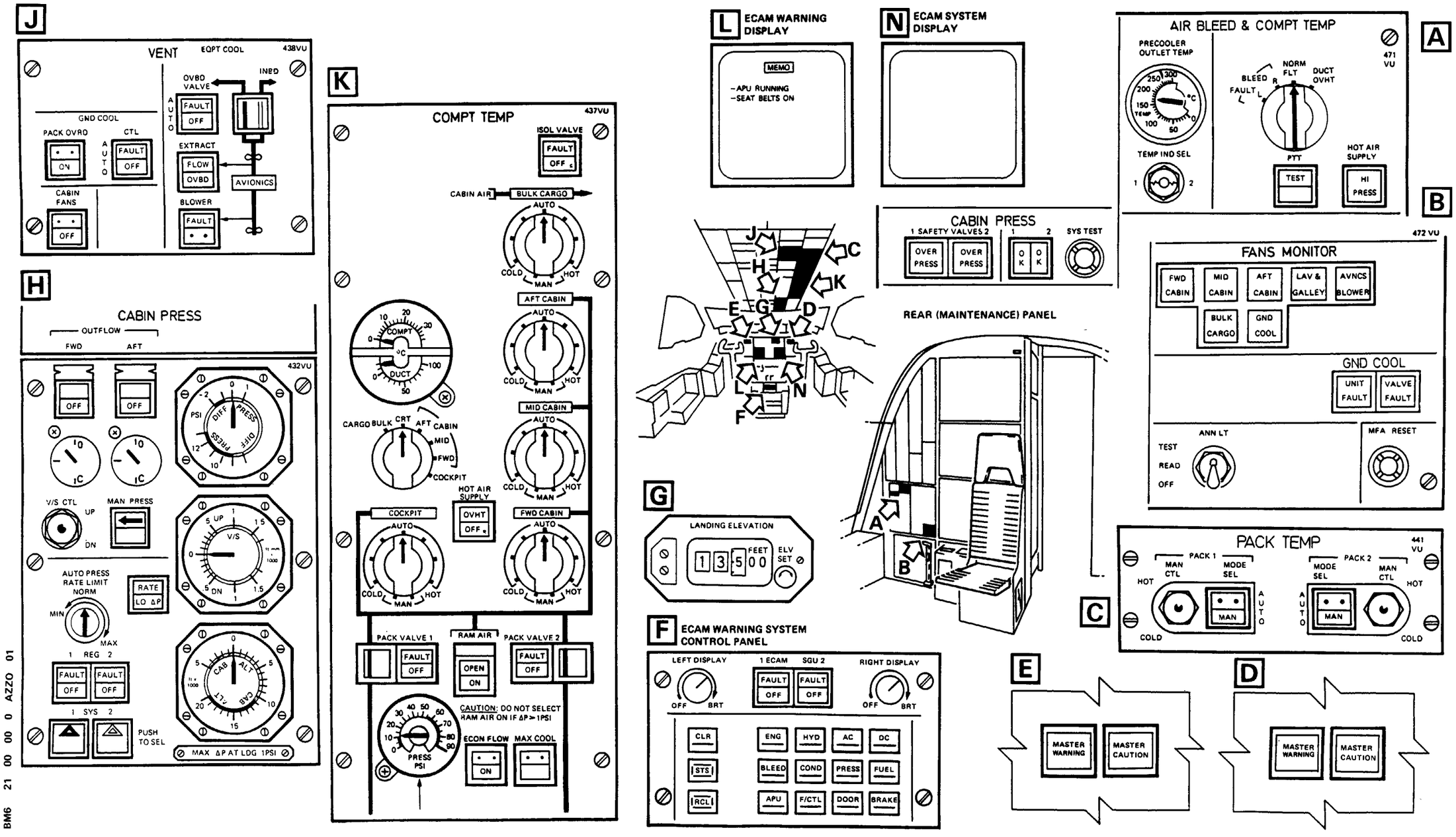

BM6 21 00 00 0 AZZO 01

General Controls and Indicators Location
Figure 004

R EFFECTIVITY: 001-100,

PIA

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A. Air Conditioning Power Supply
(Ref. Fig. 005)

4. Air Conditioning ECAM Displays

A. General
The ECAM system is designed to provide operational assistance for both normal and abnormal operations. It is mainly a display system which gives to the crew all necessary information on the functioning of the aircraft systems. This operational assistance is given through CRT's (Cathode Ray Tube) by means of messages or system synoptics.
The displayed information is used either in normal operation for monitoring systems or in abnormal operation to help the crew in its diagnosis and orient its corrective actions.

B. Displays and System Failures
For system displays and failure analyses diagrams covering the air conditioning system. Ref: ECAM DATA BOOK 31-52-21.

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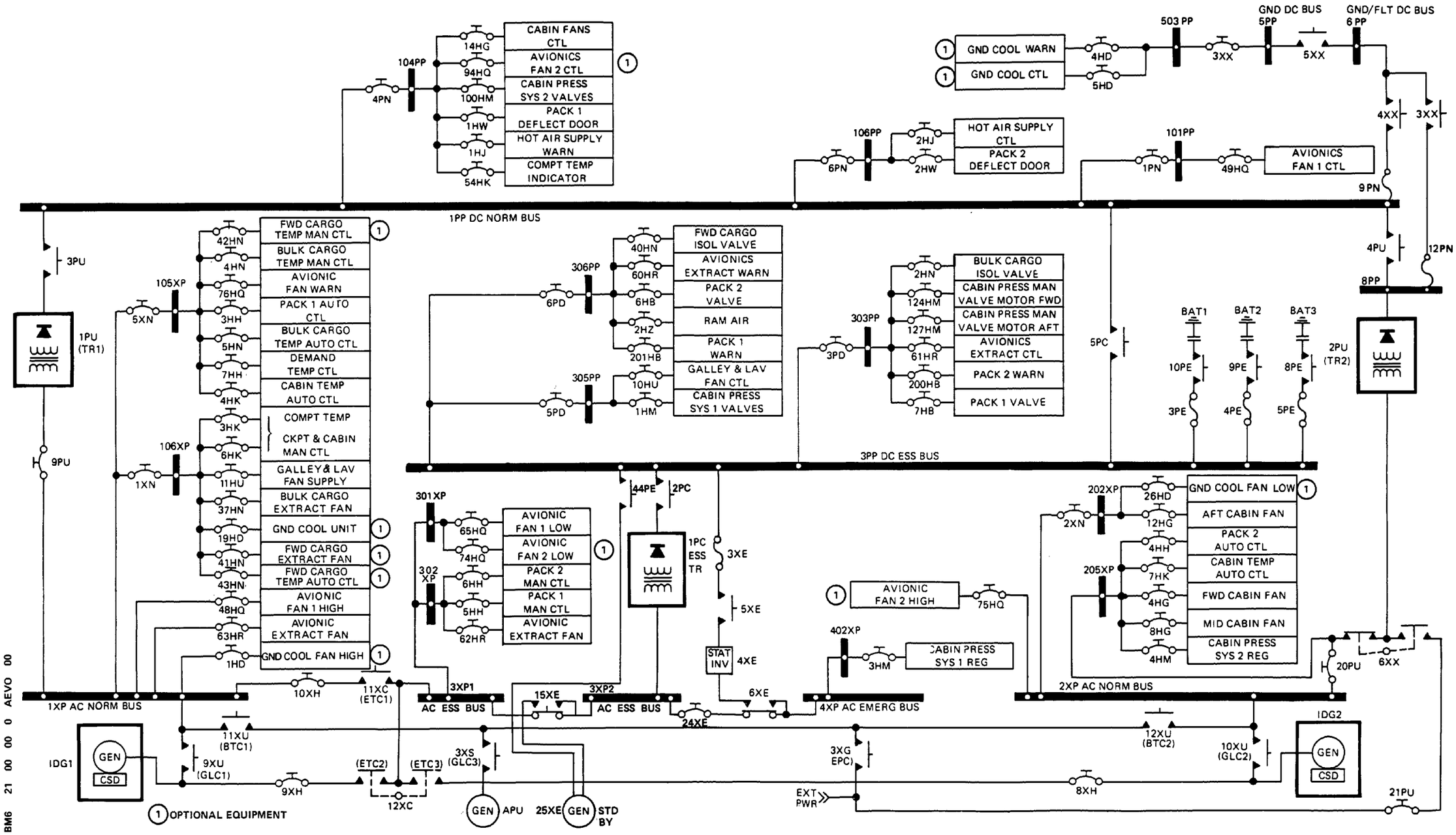


Electrical Power Supply Diagram
Figure 005

COMPRESSION - DESCRIPTION AND OPERATION

1. General

Compressed air for air conditioning is supplied by the pneumatic system (Ref. 36-00-00).
This air is bled from the crossfeed duct ensuring crossbleed between the bleed air supply systems.
The airflow is controlled by two pack flow control valves, each associated with one refrigeration unit pack (Ref. 21-11-00).

2. Description

R **ON A/C 001-100,

(Ref. Fig. 001)

R **ON A/C 101-200,

(Ref. Fig. 002)

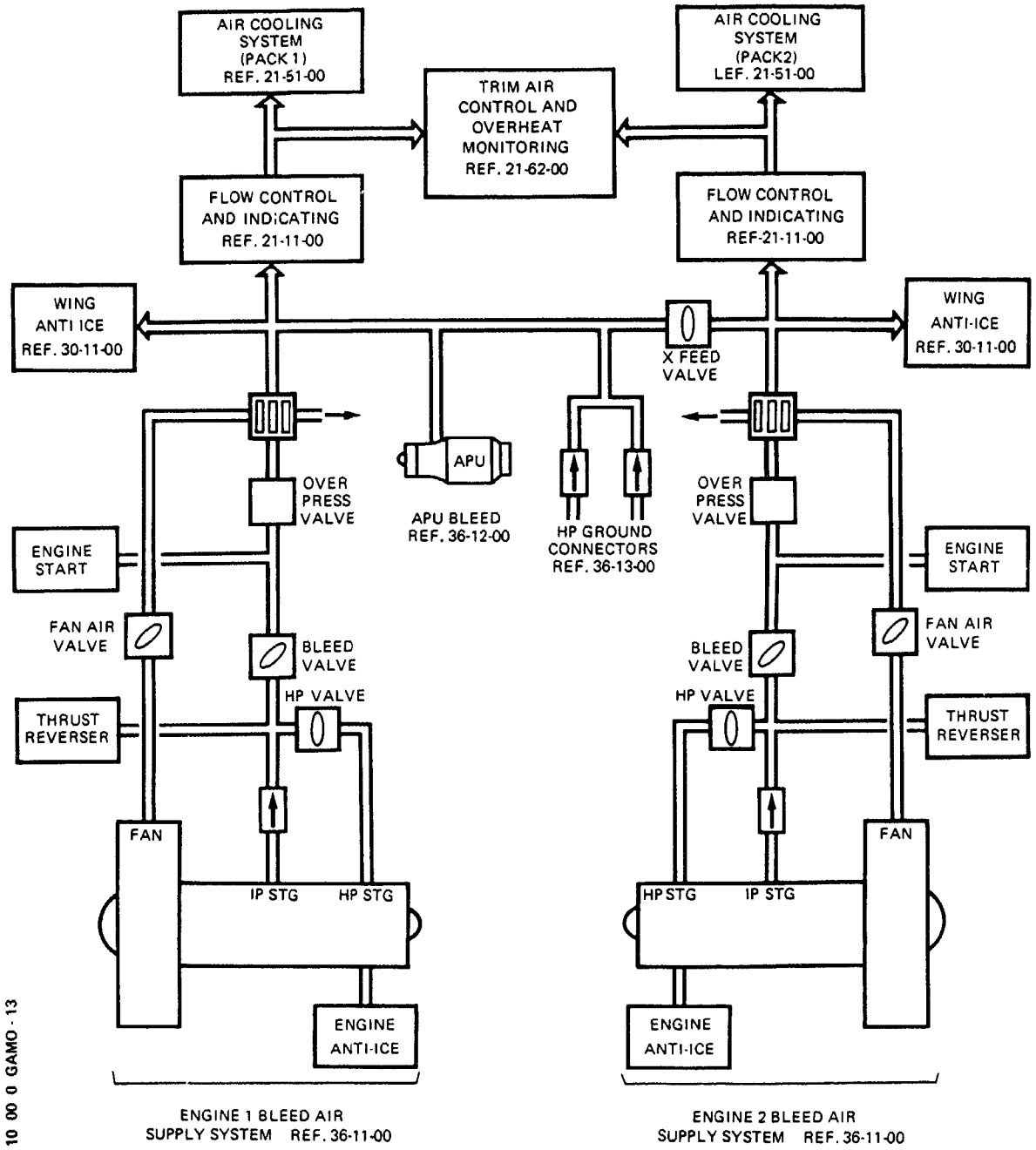
R **ON A/C ALL

Compressed air from the pneumatic system is supplied from the following sources :

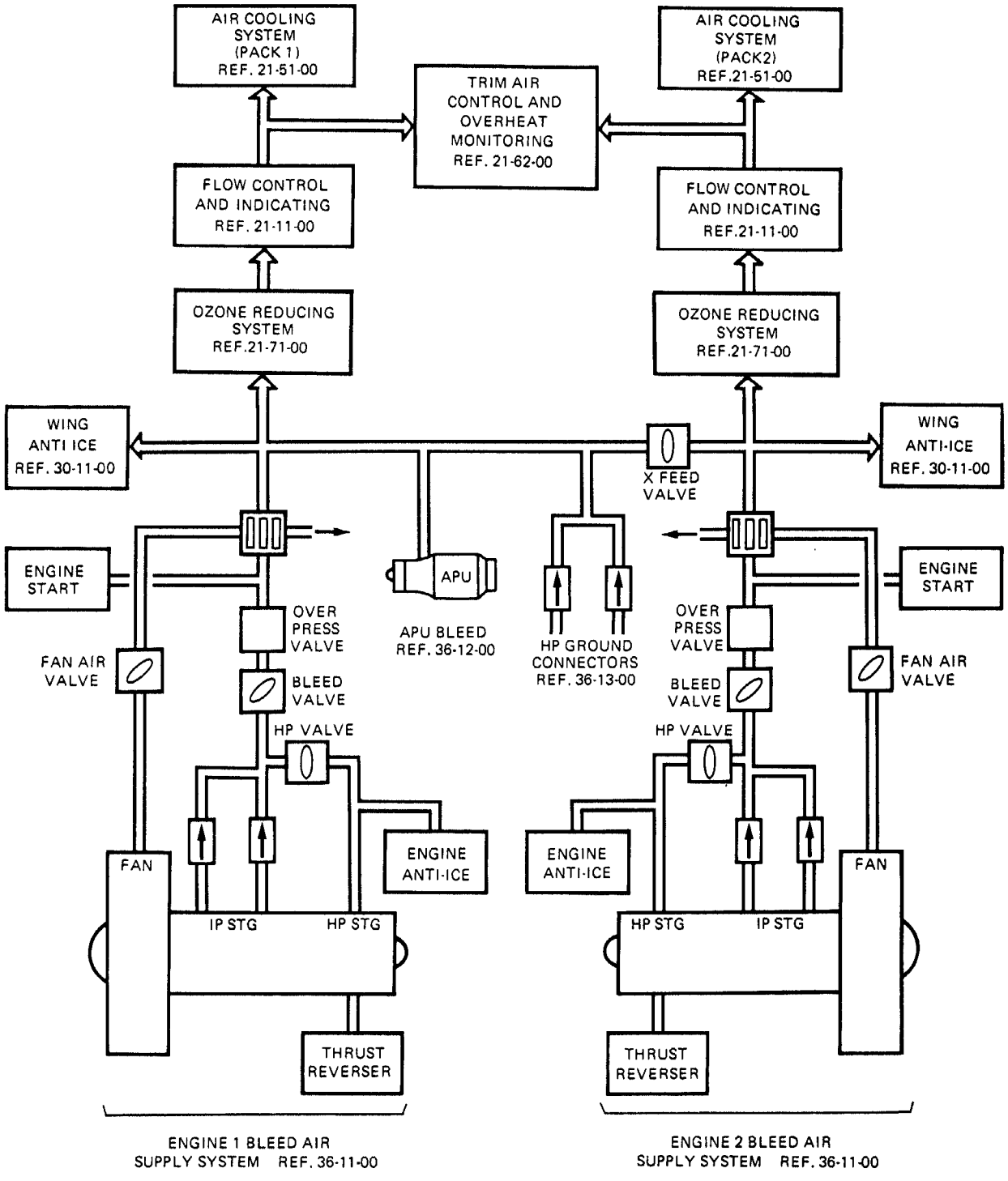
A. The Engine Bleed Air Supply System (Ref. 36-11-00)
Each engine supplies air to one refrigeration unit pack.
In the event of failure of one engine bleed air supply system, the other engine ensures air supply to both refrigeration unit packs.

B. The APU Bleed Air Supply System
Air supply from the APU is mainly used on the ground but may be used in flight to limited altitudes.
When the APU air bleed is selected, the engine air bleed is automatically shut off.

C. The Ground Compressed Air Supply System
Two HP ground connectors are provided for connection to one or two HP ground air supply units designed to supply the refrigeration unit packs.



Compression - Airflow Diagram
Figure 001



BM5 21 10 00 0 PWTO - 19

Compression - Airflow Diagram
Figure 002

FLOW CONTROL AND INDICATING - DESCRIPTION AND OPERATION

1. General

Bleed airflow is controlled by the pack flow control valves.
The valves limit the airflow through the refrigeration unit packs so that a virtually constant volumetric airflow is maintained to supply the pressurized compartments.

**ON A/C 101-200,

Upstream of the valve, air passes through an ozone reducer in order to restrict ozone concentration in the cabin.

**ON A/C ALL

2. Component Location

(Ref. Fig. 001)
(Ref. Fig. 002)

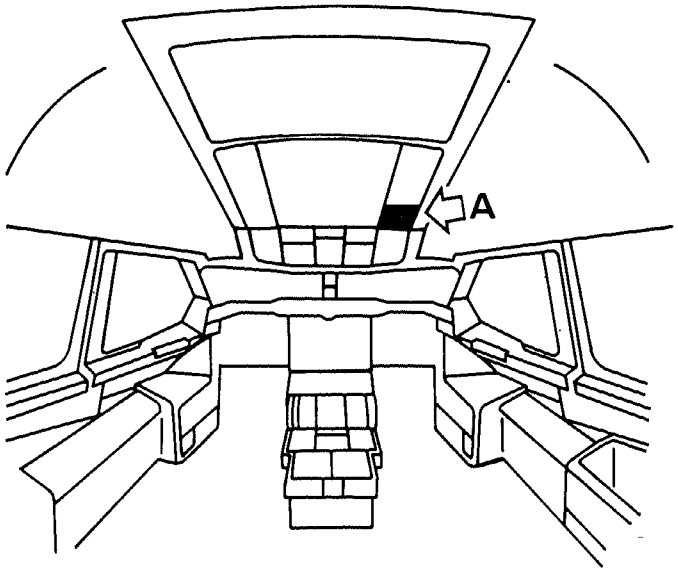
R **ON A/C 105-200,

R Post SB 21-2055 For A/C 105-200,

R (Ref. Fig. 003)

R **ON A/C ALL

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
68HB	VALVE-FLOW CTL, PACK2		144	147BZ	21-11-11
69HB	VALVE-FLOW CTL, PACK1		143	147BZ	21-11-11
188HB	ANNUNCIATOR-COMPT TEMP/PACK VALVE 2	437VU	212		21-11-00
189HB	P/BSW-COMPT TEMP/PACK VALVE 2	437VU	212		21-11-00
190HB	ANNUNCIATOR-COMPT TEMP/PACK VALVE 1	437VU	212		21-11-00
191HB	P/BSW-COMPT TEMP/PACK VALVE 1	437VU	212		21-11-00
202HB	P/BSW-COMPT TEMP/ECON FLOW	437VU	212		21-11-00
13WV	TRANSMITTER-FLOW, PACK1		143	147BZ	21-11-12
14WV	TRANSMITTER-FLOW, PACK2		144	147BZ	21-11-12



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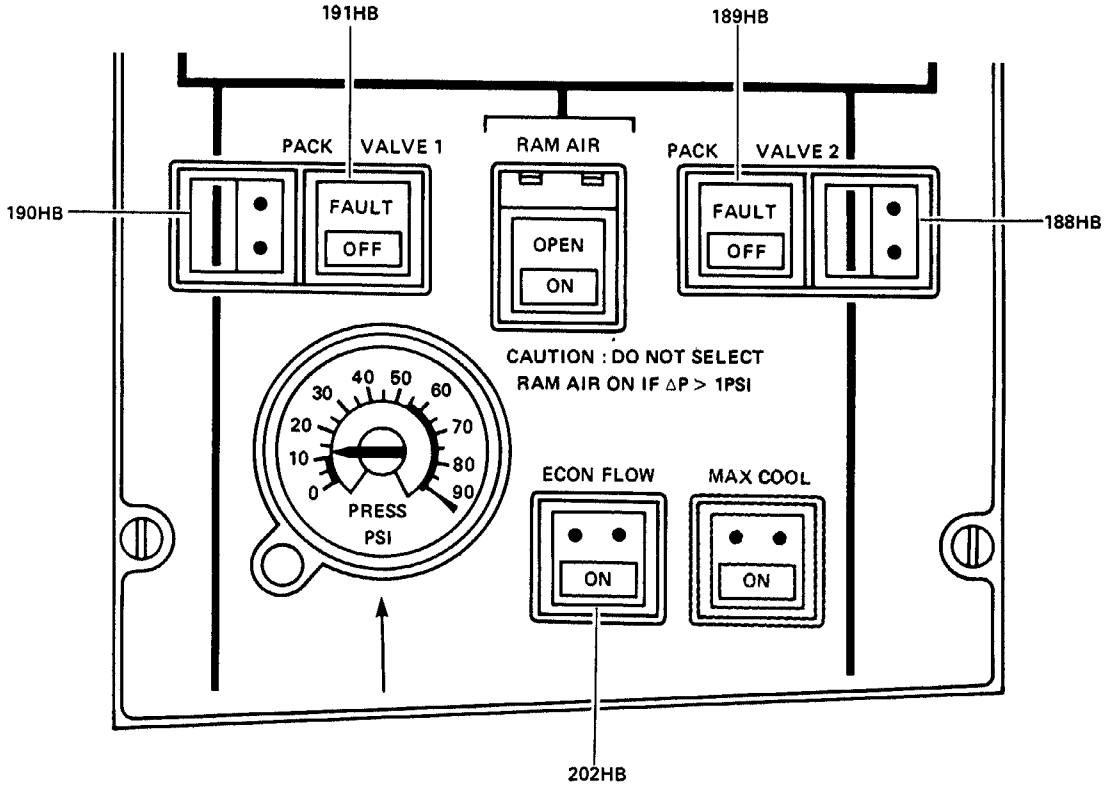

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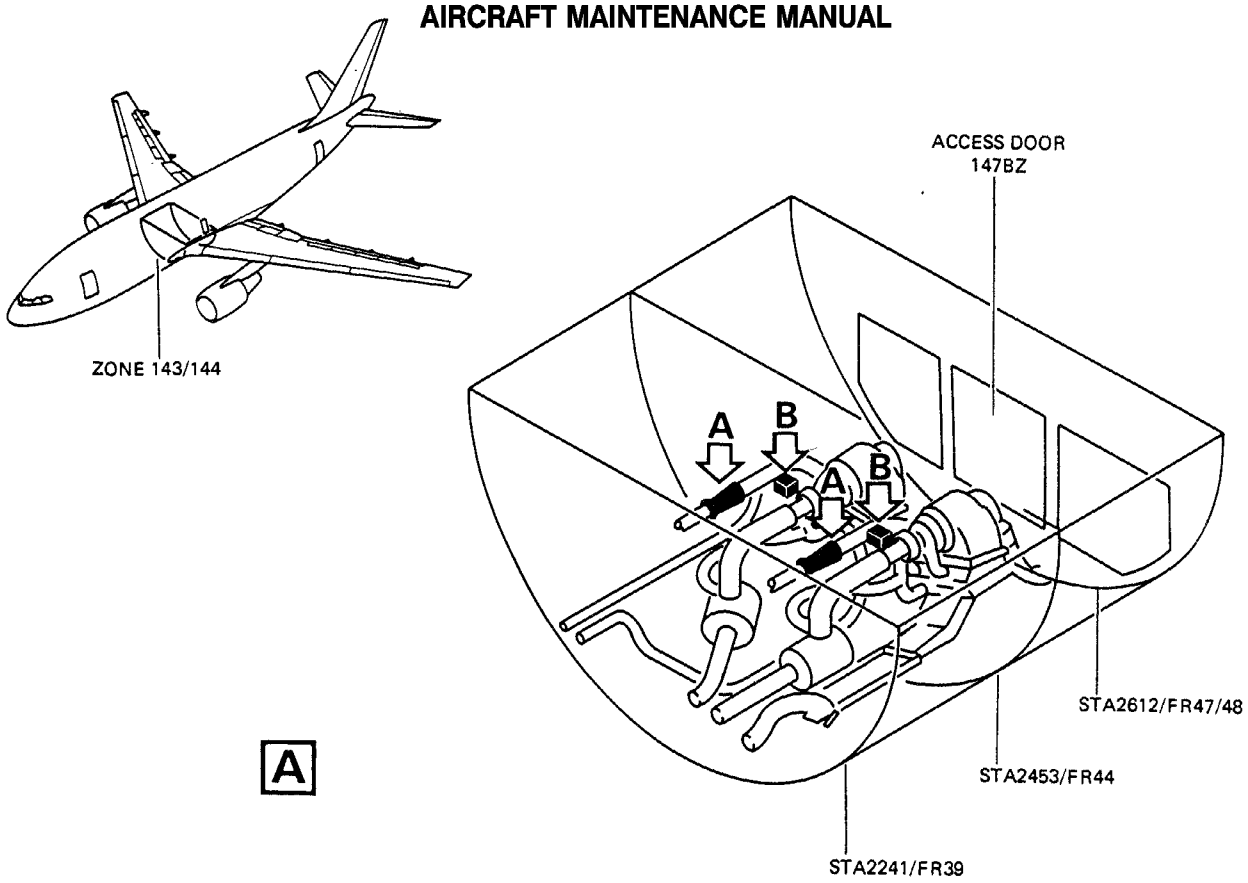
Control and Indicating - Location
Figure 001



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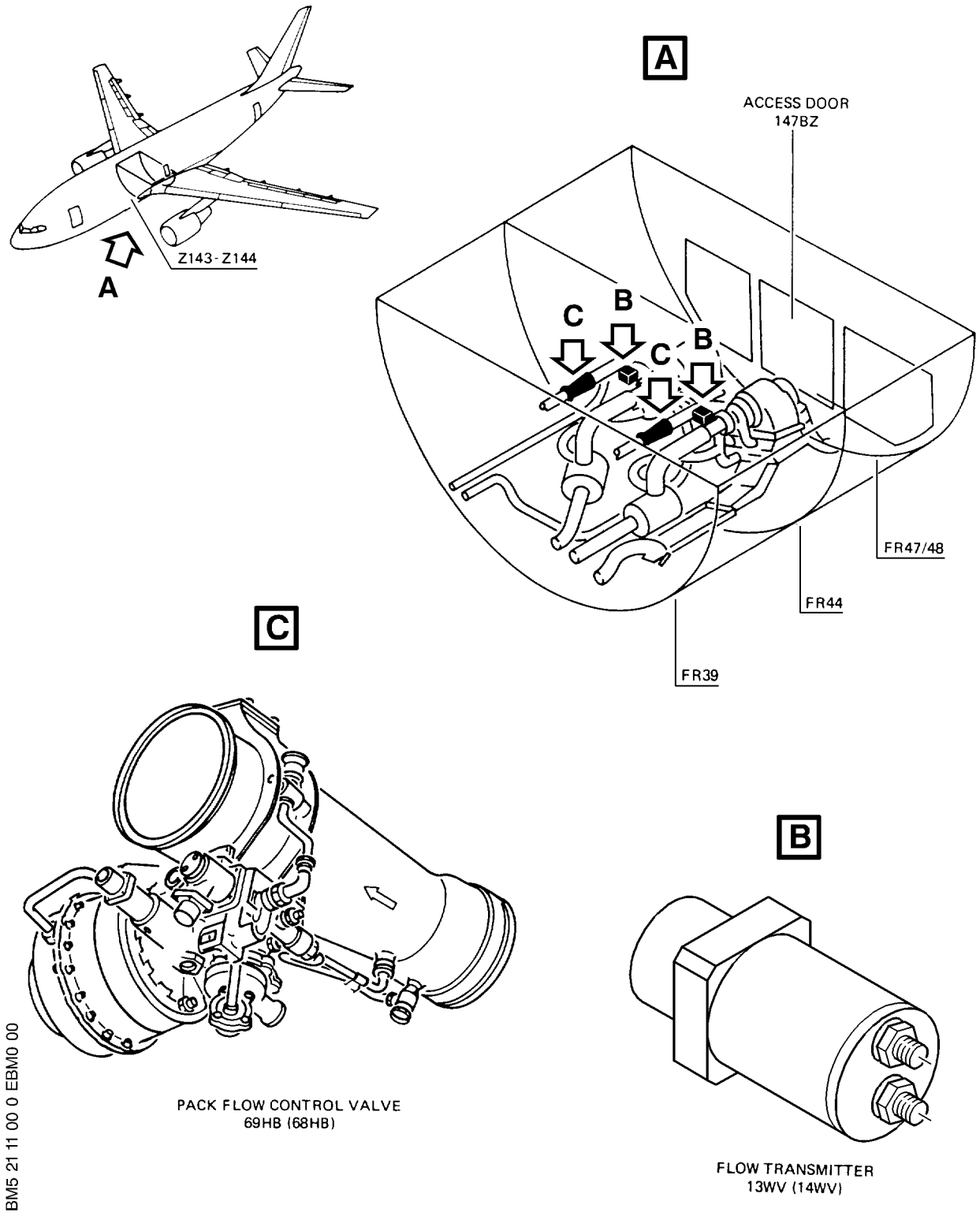
Component Location in Air Conditioning Compartment
Figure 002



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Component Location in Air Conditioning Compartment
Figure 003

3. Description

A. Flow Control

**ON A/C 001-100,

(Ref. Fig. 004)

**ON A/C 101-200,

(Ref. Fig. 005)

**ON A/C ALL

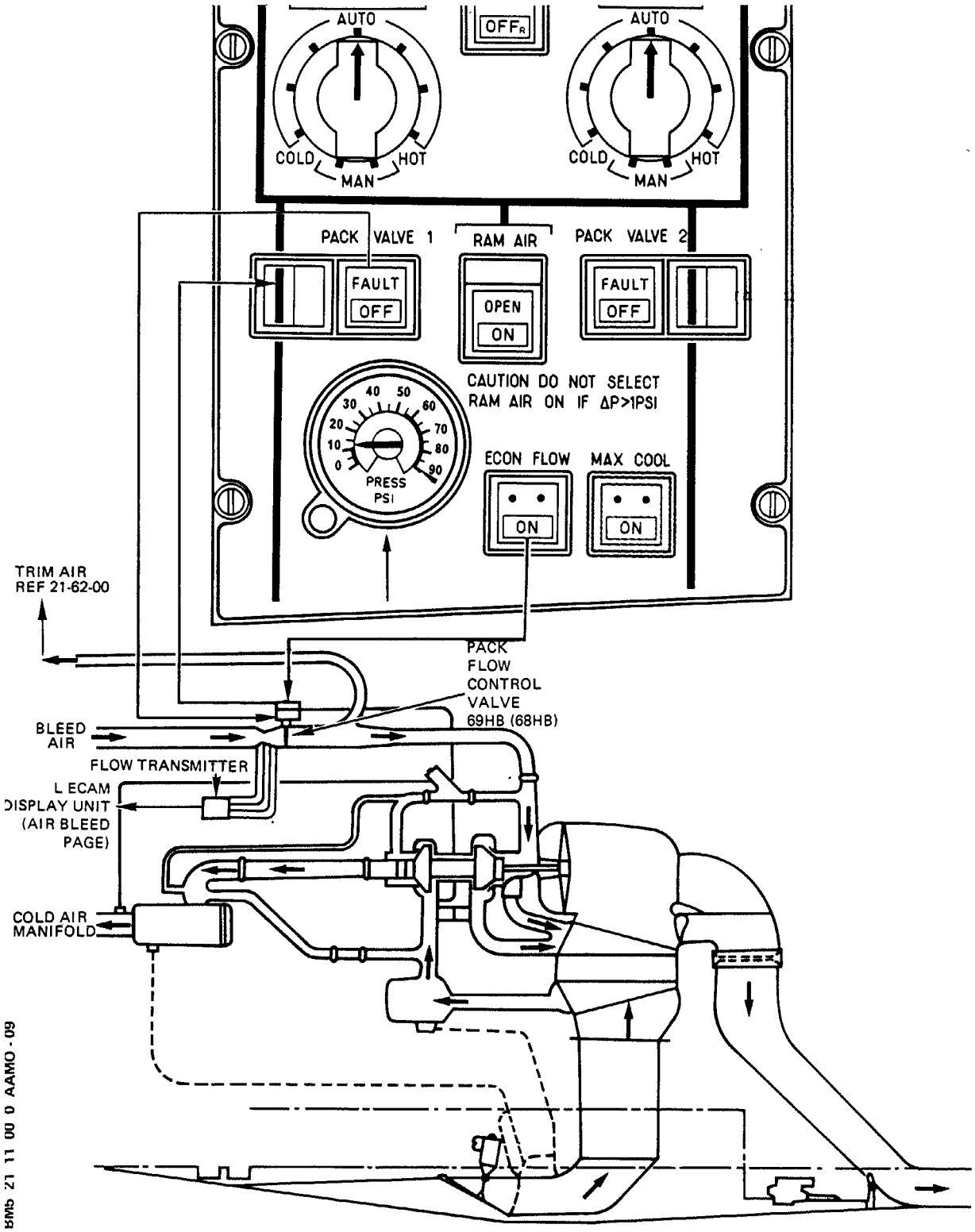
Pack flow control valves 69HB and 68HB ensure control of the airflow through the left and right refrigeration unit packs respectively. A flow transmitter serves to monitor the airflow through each valve.

B. Controls and Indicating (Ref. Fig. 006)

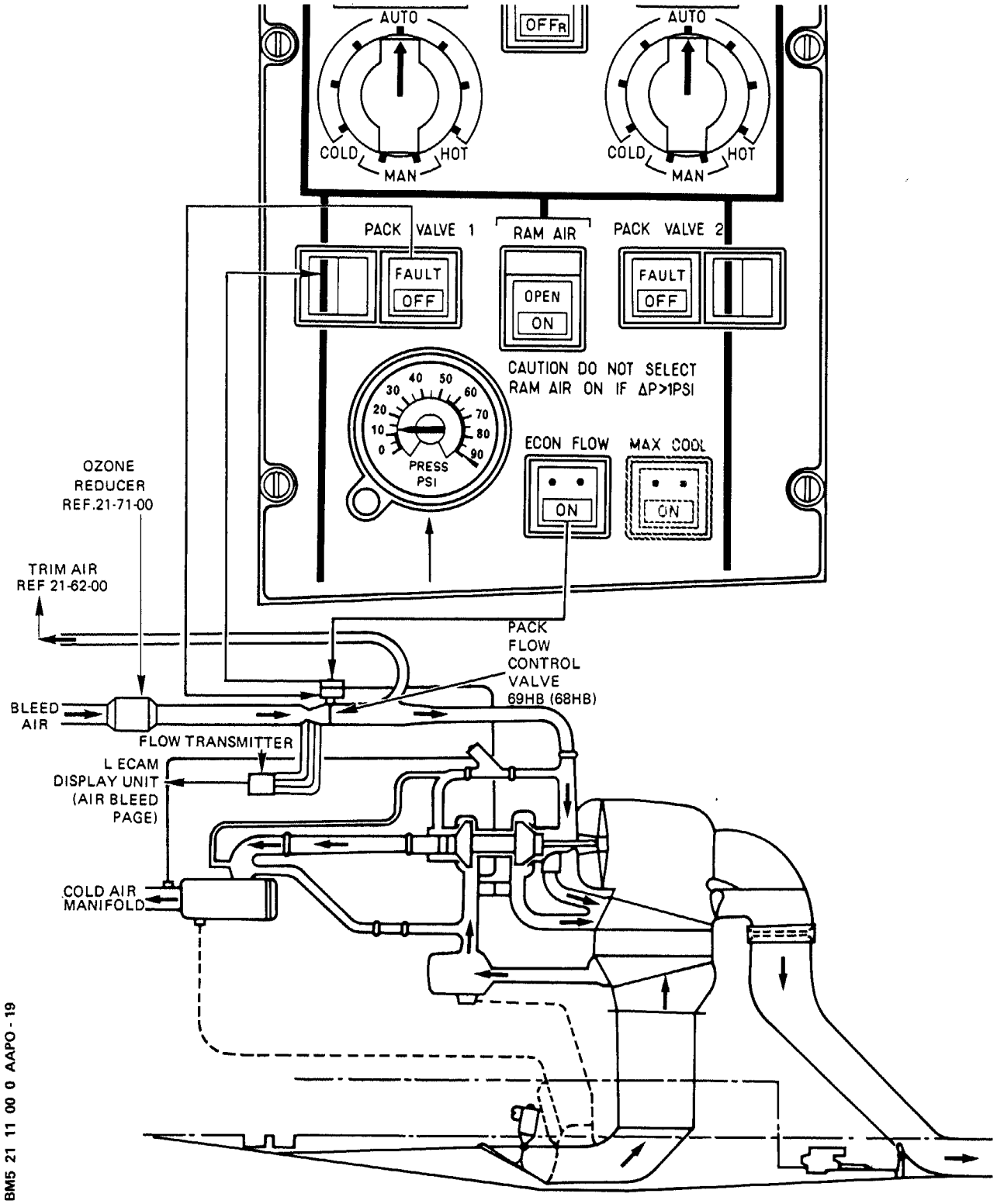
C. Central Warnings
Illumination of the FAULT legend on the PACK VALVE pushbutton switch is accompanied by :
- activation of the single chime aural warning
- illumination of the MASTER CAUTION light on the CAPT and F/O main instrument panels.
- message display on the left ECAM display unit
- display of the AIR BLEED page on the right ECAM display unit with the following visual indications :
  . pack flow control valve position
  . pack symbol (flow scale : HI-LO)
  . pack flow bug (Ref. 31-51-00).

4. Component Description

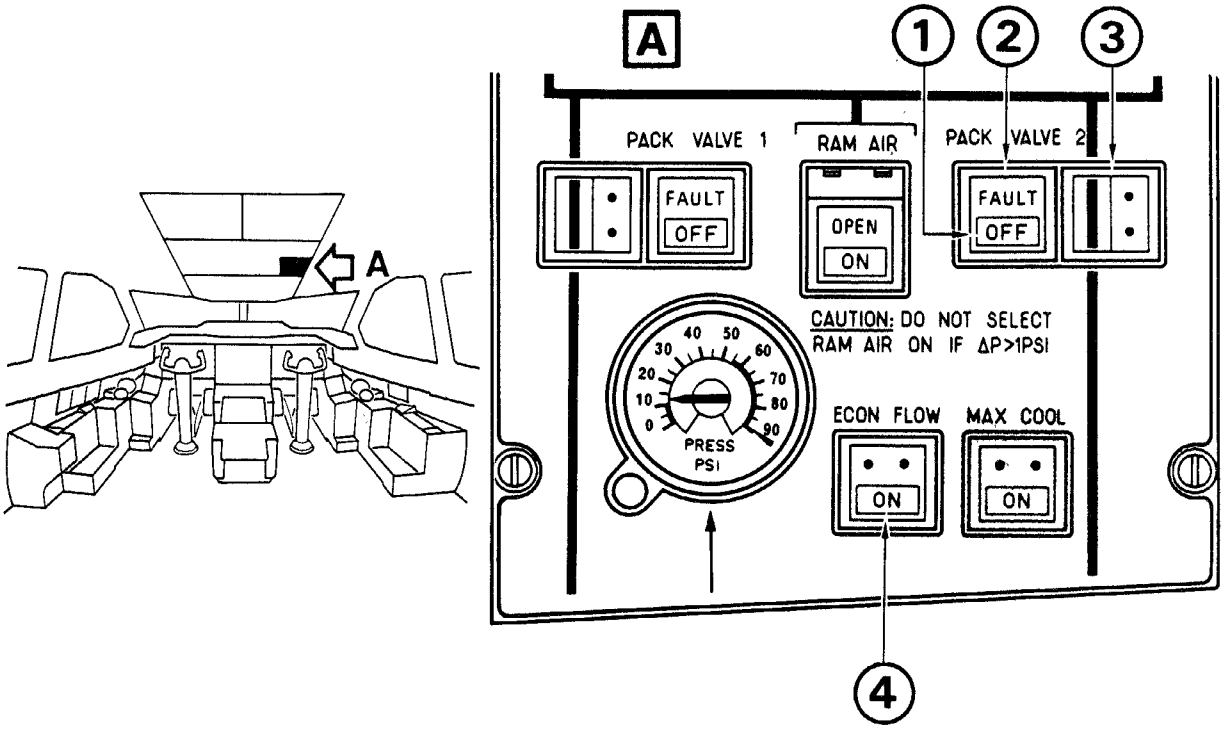
A. Pack Flow Control Valve 69HB (68HB) (Ref. Fig. 007, 008)
The valve is an electrically controlled, pneumatically actuated, venturi-type butterfly flow control and shut-off valve. The unit controls the airflow rate through the system in accordance with a predetermined dual flow schedule. Selection of the desired schedule is accomplished by an electrical signal to a solenoid valve. The valve basically consists of the following :
- a venturi-type airflow housing with integral inline flanges for direct mounting of the unit in the aircraft ducting. A precision machined bore in the housing serves as a seat for mating with the butterfly closure element.
- a butterfly-type modulating and closure element consisting of a butterfly plate equipped with a piston ring type seal installed in a groove around the periphery of the plate. The butterfly shaft is in ball bearings installed within the bosses in the airflow housing.



Flow Control - Airflow Diagram
Figure 004



Flow Control - Airflow Diagram
Figure 005



- 1. PACK VALVE PUSHBUTTON SWITCH SERVES TO CONTROL THE PACK FLOW CONTROL VALVE ; OPENING OF THE VALVE CONTROLS REFRIGERATION UNIT PACK START-UP ; CLOSURE OF THE VALVE CONTROLS PACK SHUTDOWN (REF. 21-51-00).
  - PUSHBUTTON SWITCH PRESSED (IN) :
    - THE VALVE IS PNEUMATICALLY CONTROLLED AND REGULATES THE AIRFLOW IF UPSTREAM PRESSURE IS HIGHER THAN 10 PSI.
    - THE VALVE IS AUTOMATICALLY AND PNEUMATICALLY CONTROLLED TO THE CLOSED POSITION IF OVERHEAT IS DETECTED AT THE REFRIGERATION UNIT PACK
    - THE VALVE IS AUTOMATICALLY AND ELECTRICALLY CONTROLLED TO THE CLOSED POSITION BY ACTIVATING THE ENG FIRE HANDLE, THE DITCHING CONTROL OR ARMING THE ENGINE START SEQUENCE.
  - PUSHBUTTON SWITCH RELEASED (OUT) (OFF LEGEND COMES ON WHITE)
    - THE VALVE IS ELECTRICALLY CONTROLLED TO THE CLOSED POSITION.

- 2. FAULT LEGEND ON PACK VALVE PUSHBUTTON SWITCH COMES ON AMBER IN THE EVENT OF :
  - DISAGREEMENT BETWEEN VALVE POSITION AND VALVE SELECTED POSITION.

- 3. FLOWBAR ON PACK VALVE ANNUNCIATOR
  - ON : VALVE REGULATES PACK FLOW
  - OFF : VALVE IS CLOSED.

- 4. ECON FLOW PUSHBUTTON SWITCH
  - PUSHBUTTON SWITCH PRESSED (IN) (ON LEGEND COMES ON BLUE) : ECONOMIC FLOW MODE IS SELECTED (REDUCTION OF THE AIRFLOW IN FLIGHT ONLY AND IF BOTH PACKS ARE OPERATING).
  - PUSHBUTTON SWITCH RELEASED (OUT) : NORMAL AIRFLOW.

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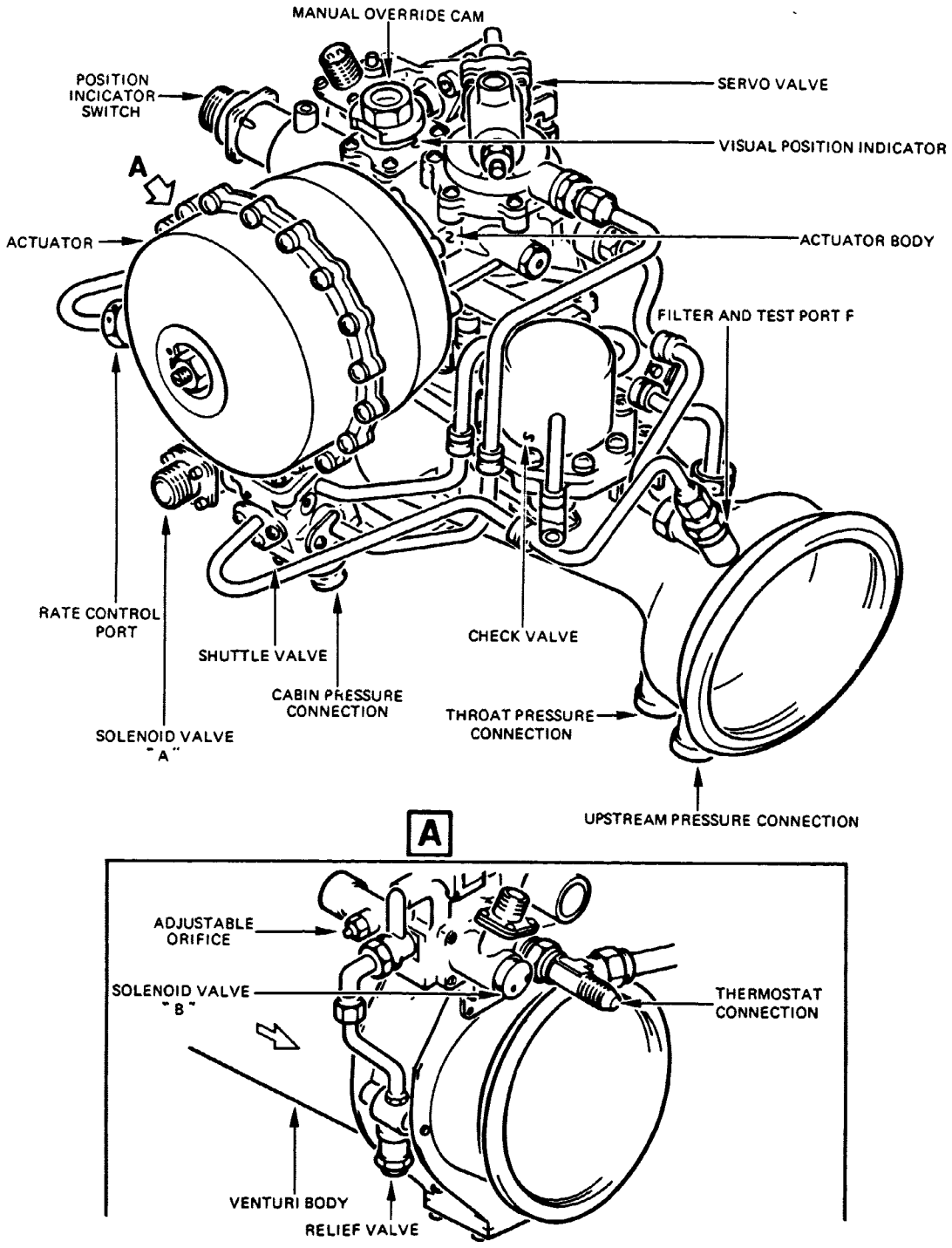
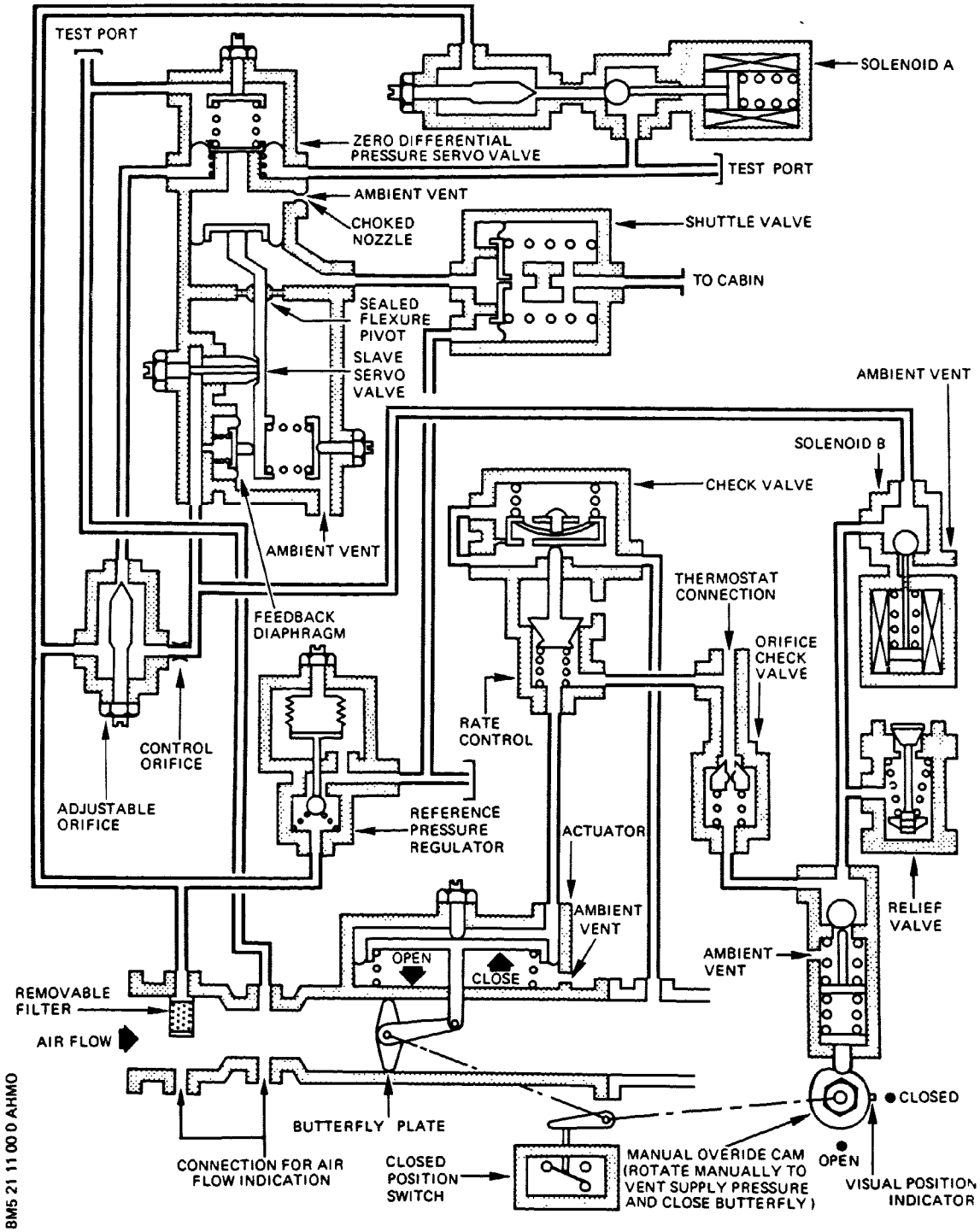
COMPT TEMP Panel 437VU - Pack Flow Control Section
Figure 006



Pack Flow Control Valve
Figure 007



Pack Flow Control Valve - Schematic
Figure 008

- a diaphragm-type pneumatic actuator mechanically coupled through a lever arm to the butterfly shaft and spring loaded so that the butterfly is in the normally closed position
- a cabin pressure-biased servo that senses the venturi inlet-to-throat pressure differential and applies a pneumatic signal to the actuator to modulate the butterfly and maintain the desired flow schedule as a function of cabin pressure
- a solenoid valve assembly (solenoid A) to select either the low flow or the high flow setting
- a second solenoid valve assembly (solenoid B) which operates a shutoff control for the valve irrespective of the position of the other solenoid
- an external port for connection to the pneumatic thermostat and fusible plugs ; in case of excessive temperature at the refrigeration unit pack compressor inlet or turbine outlet (Ref. 21-51-00), the thermostat and fusible plugs cause the pack flow control valve to close by venting to ambient the actuator pressure.
  The normal (100%) flow is obtained with both solenoids de-energized. For operation on reduced flow (economic) (68%), solenoid A is energized. Closure of the valve for shutoff operation is accomplished by energizing solenoid B.

B. Flow Transmitter 13WV (14WV) (Ref. Fig. 009)
The flow transmitter is connected by sense lines to the throat and inlet of the pack flow control valve venturi. The transmitter mainly consists of a diaphragm assembly and a synchro transmitter. The differential pressure through the venturi is measured and converted into an electrical signal which is transmitted to the right ECAM display unit.

5. Operation

**ON A/C 101-200,

(Ref. Fig. 010)

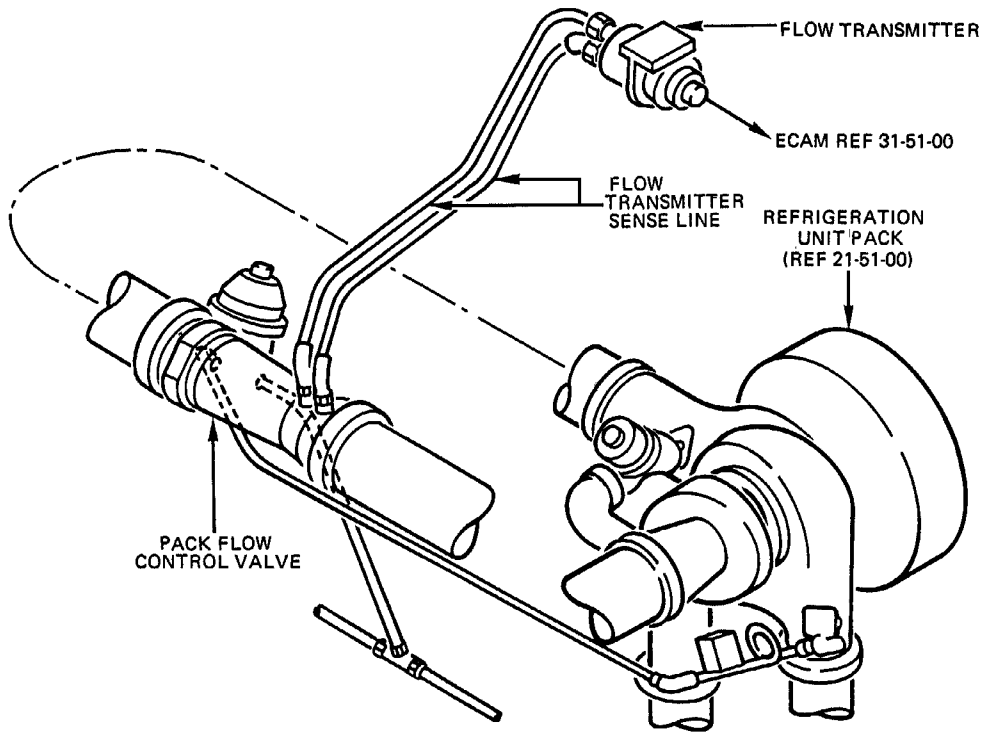
**ON A/C 001-100,

(Ref. Fig. 011)

**ON A/C ALL

A. Automatic Normal Operation
- PACK VALVE 1 (PACK VALVE 2) pushbutton switch 191HB (189HB) pressed (in)
- ECON FLOW pushbutton switch 202HB released (out).

Solenoids A and B of pack 1 (pack 2) flow control valve 69HB (68HB) are de-energized ; the valve is pneumatically controlled to the open position which enables hot air to be supplied to the refrigeration unit pack.
When the PACK VALVE 1 (2) pushbutton switch is released (out) (OFF legend on) or when valve automatic closure is selected, solenoid B is energized, valve actuator pressure is vented to ambient thus causing the valve to close.



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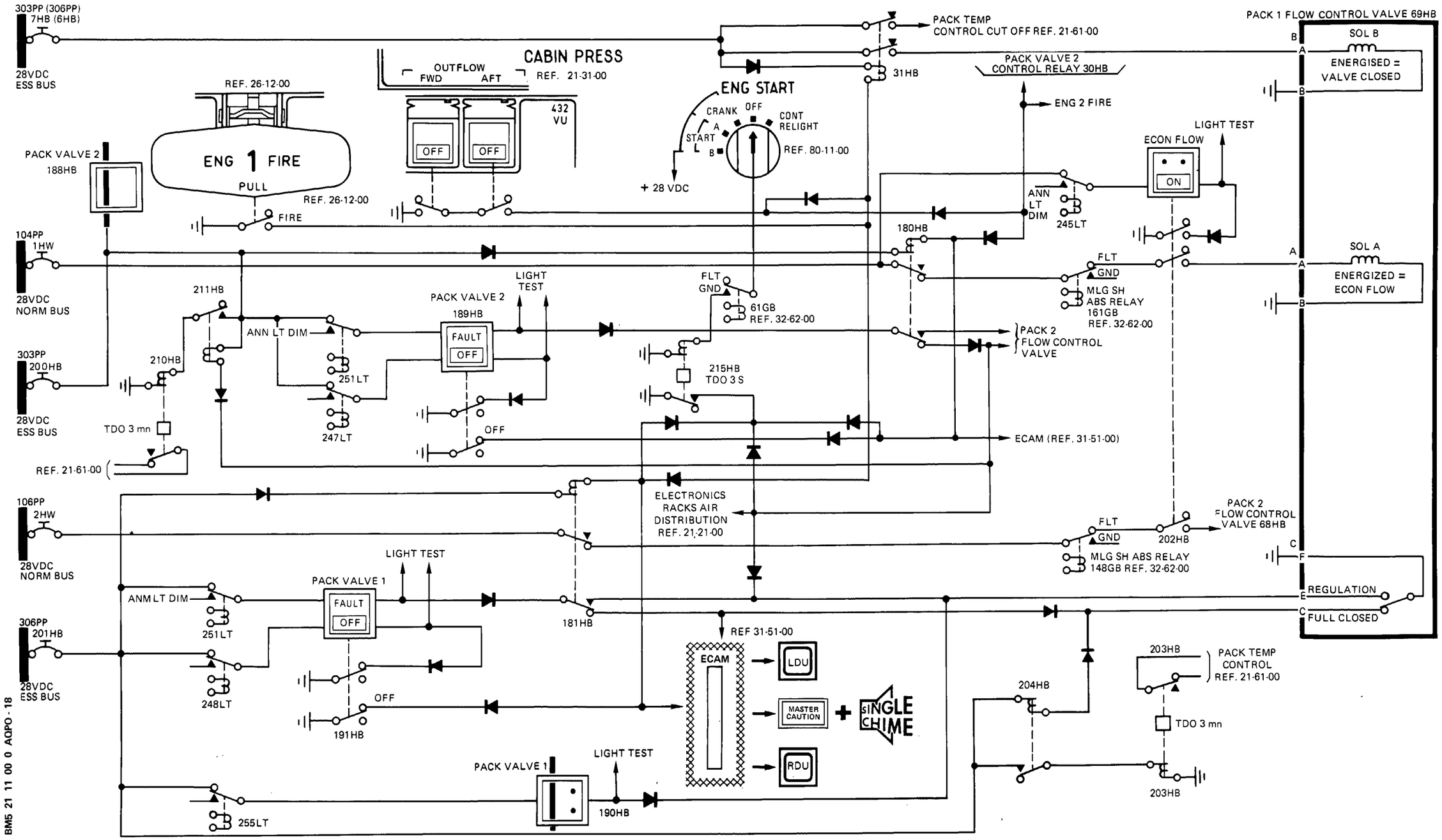
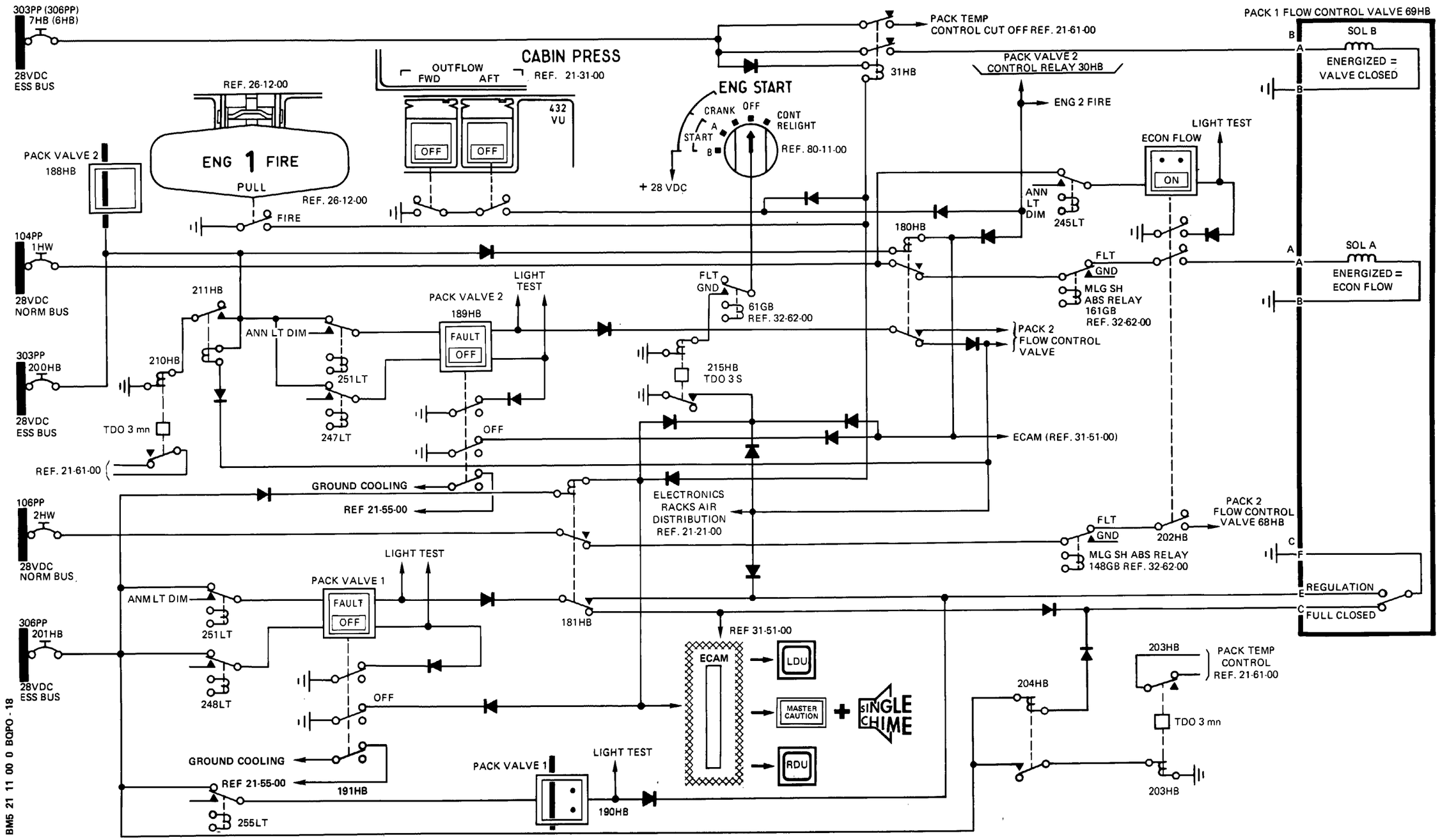
Flow Transmitter
Figure 009



Flow Control - Schematic
Figure 010



Flow Control - Schematic
Figure 011

Closure of the valve(s) is automatic in the following cases :
- engine fire (actuation of **ENG 1 (ENG 2) FIRE** handle) : closure of the corresponding valve
- during the engine start sequence (**ENG START** selector switch in **CRANK, START A** or **START B** position) : simultaneous closure of the two pack flow control valves
- In flight, in order to avoid the inadvertent closing of the air conditioning packs, when the **ENG START** selector switch is unintentionally selected, the closing signal of the pack flow control valves is inhibited.
- closure of the two cabin pressure outflow valves (**CABIN PRESS/VALVES/ OUTFLOW/FWD** and **AFT** pushbutton switches released out, **OFF** legends on) : simultaneous closure of the two pack flow control valves.

After automatic closure of the pack flow control valve, the **FAULT** legend on **PACK VALVE 1 (2)** pushbutton switch comes on and the central warnings are activated by a signal transmitted by the valve position indicator switch. The **FAULT** legend goes off when the **PACK VALVE 1 (2)** pushbutton switch is pressed (in); the central warnings only remain activated.

NOTE : In the event of overheat, closure of the pack flow control valve is controlled by the thermostats or fusible plugs of the refrigeration unit pack (Ref. 21-51-00).

B. In-Flight Economic Mode Operation
- **PACK VALVE 1 (2)** pushbutton switch **191HB (189HB)** pressed (in)
- **ECON FLOW** pushbutton switch **202HB** pressed (in), **ON** legend on.

Solenoid **B** of pack 1 (2) flow control valve **69HB (68HB)** is de-energized and solenoid **A** is energized.
The setting values of the servo valve are modified to reduce flow control valve opening which thereby reduces the airflow (68% of the normal airflow).
The selection of the economic flow mode is inhibited :
- on the ground,
- in flight, in case of failure of one refrigeration unit pack :
  . **PACK VALVE 1** pushbutton switch released (out), **OFF** legend on : refrigeration unit pack 2 selection is inhibited.
  . **PACK VALVE 2** pushbutton switch released (out), **OFF** legend on : refrigeration unit pack 1 selection is inhibited.

1. Operational test

A. Reason for the Job
To check for correct operation of :
- warning system and pack flow control valve 69HB (68HB) automatic closing safety devices
- FAULT warning (valve disagree)
- Economic flow mode (ECON FLOW).

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 49-00-00, P. Block 501	Airborne Auxiliary Power or One of the two HP Ground Air Supply Units Having the Following Characteristics : - pressure between 3.1 and 3.4 bars (45 and 50 psi) - temperature between 180°C and 230°C (355°F and 445°F) - mass flow between 2.02 and 2.2 kg/s (4.2 and 4.8 lb/s)

C. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Make certain that electronics racks ventilation is correct.
(c)Make certain that circuit breakers closed, particularly those associated with COMPT TEMP, HYDRAULIC (LDG GEAR PROX DET & RELAYS 2GB, 119GB) ECAM, AIR BLEED, AIR BLEED & COMPT TEMP and CABIN PRESS.
(d)On COMPT TEMP panel 437VU
- release PACK VALVE 1 and 2 pushbutton switches (OFF legends on).
(e)On CABIN PRESS panel 432VU
- check that OUTFLOW FWD and AFT pushbutton switches are pressed (in).
(f)On overhead panel
- check that ENG1 FIRE and ENG2 FIRE handles are pushed (in).
(g)On ENG START section of panel 429VU
- check that ENG START selector switch is in OFF position and that START 1 and START 2 pushbutton switches are released (out).
(h)On ECAM control panel
- press BLEED pushbutton switch
. pushbutton switch integral light comes on
. on right ECAM display unit, AIR BLEED page is displayed
- using LEFT and RIGHT DISPLAY knobs, adjust brightness on left and right ECAM display units.
(2)Test

(a)Check for correct operation of FAULT warning (valve disagree), warning system and pack flow control valve automatic closing safety devices.

NOTE 1 : During the test disregard configuration of OFF legends on OUTFLOW FWD and AFT pushbutton switches, and configuration of MASTER CAUTION warning lights.

NOTE 2 : Prior to test, open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG1 & 2/FIRE EXTING/SQUIBA/BTL1	1WE	335/R71
133VU	ENG1 & 2/FIRE EXTING/SQUIBA/BTL2	3WE	335/R72
22VU	ENG1 & 2/SQUIB/1B	5WE	207/C19
22VU	ENG1 & 2/SQUIB/2B	7WE	207/C20

NOTE 3 : Pressurize pneumatic system

- using HP ground pneumatic source
  - . connect HP ground air supply unit to HP ground connector
    NOTE : To carry out this procedure and to test the right refrigeration unit pack only, open the crossfeed valve as follow :
    On AIR BLEED panel 436VU :
    - release X FEED mode pushbutton switch (MAN legend on)
    - press X FEED valve position pushbutton switch (flowbar in line).
- using APU
  - . start up APU (Ref. 49-00-00, P. Block 501).
    On AIR BLEED panel 436VU :
    - place APU BLEED switch in ON position (flowbar on APU BLEED annunciator comes on)
    - press BLEED pushbutton switch
      - . pushbutton switch integral light comes on
      - . on right ECAM display unit, AIR BLEED page is displayed.
    - using LEFT and RIGHT DISPLAY knobs, adjust brightness on left and right ECAM display unit.

ACTION	RESULT
1. On COMPT TEMP panel 437VU - press PACK VALVE 1 (2) pushbutton switch	On panel 437VU - OFF legend on PACK VALVE 1 (2) pushbutton switch goes off - FAULT legend on PACK VALVE 1 (2) pushbutton switch comes on.
- release PACK VALVE 1 (2) pushbutton switch	On panel 437VU - FAULT legend on PACK VALVE 1 (2) pushbutton switch goes off - OFF legend on PACK VALVE 1 (2) pushbutton switch comes on.
2. Pressurize pneumatic system (Ref.	

ACTION	RESULT
NOTE 3)	
3. On panel 22VU - open **COMPT TEMP PACK 1 (2) VALVE** circuit breaker **7HB (6HB)** (location 203/G22(24))	On panel **437VU** - **OFF** legend on **PACK VALVE 1 (2)** pushbutton switch remains on. - **FAULT** legend on **PACK VALVE 1 (2)** pushbutton switch comes on - Flowbar on **PACK VALVE 1 (2)** annunciator is on.
4. On panel **437VU** - press **PACK VALVE 1 (2)** pushbutton switch	On panel **437VU** - **OFF** legend on **PACK VALVE 1 (2)** pushbutton switch goes off - **FAULT** legend on **PACK VALVE 1 (2)** pushbutton switch goes off - flowbar on **PACK VALVE 1 (2)** annunciator remains on.
5. On panel 22VU - close circuit breaker **7HB (6HB)**	No change.
6. On overhead panel - pull **ENG 1 (2) FIRE** handle	On panel **437VU** - **FAULT** legend on **PACK VALVE 1 (2)** pushbutton switch comes on - flowbar on **PACK VALVE 1 (2)** annunciator goes off.
- push **ENG 1 (2) FIRE** handle.	On panel **437VU** - **FAULT** legend on **PACK VALVE 1 (2)** pushbutton switch goes off - flowbar on **PACK VALVE 1 (2)** annunciator comes on.
7. On **CABIN PRESS** panel **432VU** - release **OUTFLOW FWD** pushbutton switch	None.
- release **OUTFLOW AFT** pushbutton switch	On panel **437VU** - **FAULT** legend on **PACK VALVE 1 (2)** pushbutton switch comes on - flowbar on **PACK VALVE 1 (2)** annunciator goes off.
- press **OUTFLOW FWD** pushbutton switch	On panel **437VU** - **FAULT** legend on **PACK VALVE 1 (2)** pushbutton switch goes off - flowbar on **PACK VALVE 1 (2)** annunciator comes on.
- press **OUTFLOW AFT** pushbutton switch	On panel **437VU** - **FAULT** legend on **PACK VALVE 1 (2)** pushbutton switch remains off.

ACTION	RESULT
8. On ENG START section of panel 429VU - place ENG START selector switch in CRANK position	On panel 437VU - FAULT legend on PACK VALVE 1 (2) pushbutton switch comes on during valve transit then goes off - flowbar on PACK VALVE 1 (2) annunciator goes off
- place ENG START selector switch in OFF position	- FAULT legend on PACK VALVE 1 (2) pushbutton switch comes on during valve transit then goes off - flowbar on PACK VALVE 1 (2) annunciator comes on.
9. On panel 133VU - open L/G PROX DET/& RELAYS SYS1/RELAYS &/RETRACT/CTL circuit breaker 2GB (line 302/U51)	No change.
10. On ENG START section of panel 429VU - place ENG START selector switch in CRANK position	No change.
- place ENG START selector switch in OFF position.	No change.
11. On panel 133VU - close circuit breaker 2GB.	No change.
12. On panel 437VU - release PACK VALVE 1 (2) push-button switch.	On panel 437VU - OFF legend on PACK VALVE 1 (2) pushbutton switch comes on - flowbar on PACK VALVE 1 (2) annunciator goes off.
13. Depressurize pneumatic system.	
14. Remove safety clips and tags and close circuit breakers 1WE, 3WE, 5WE and 7WE.	

(b) Check for correct operation of economic flow mode (ECON FLOW)

NOTE 1 : Pressurize pneumatic system (minimum 20 psig).

- using HP ground pneumatic source
  - . connect HP ground air supply unit to HP ground connector

    NOTE : To carry out this procedure and to test right refrigeration unit pack only open crossfeed valve as follows :
  - On AIR BLEED panel 436VU
    - release X FEED mode pushbutton switch (MAN legend on)
    - press X FEED valve position pushbutton switch (flowbar in line).

- using APU
  . start up APU (Ref. 49-00-00, P. Block 501).

ACTION	RESULT
1. On panel 437VU - release ECON FLOW pushbutton switch.	
2. Pressurize pneumatic system (Ref. NOTE 1).	
3. On panel 437VU - press PACK VALVE 1 and 2 pushbutton switches	On panel 437VU - OFF legends of PACK VALVE 1 and 2 go off. On AIR BLEED page (ECAM) - note position of pack flow indicating arrow.
- press ECON FLOW pushbutton switch	On panel 437VU - ON legend on ECON FLOW pushbutton switch comes on. On AIR BLEED page - No change
- release ECON FLOW pushbutton switch	On panel 437VU - ON legend on ECON FLOW pushbutton switch goes off. On AIR BLEED page - no change.
4. On panel 133VU - open L/G PROX DET/& RELAYS SYS1/RELAYS &/RETRACT/CTL circuit breaker 2GB (lines 332/U51).	No change.
5. On panel 437VU - press ECON FLOW pushbutton switch.	On panel 437VU - ON legend on ECON FLOW pushbutton switch comes on. On AIR BLEED page (ECAM) - pack 1 and 2 flow indicating arrows move towards LO.
6. On panel 133VU - close circuit breaker 2GB.	On AIR BLEED page (ECAM) - pack 1 and 2 flow indicating arrow return to initial position.
7. On panel 437VU - release ECON FLOW pushbutton switch	On panel 437VU - ON legend on ECON FLOW pushbutton switch goes off. No change on AIR BLEED page.
- release PACK VALVE 1 and 2 pushbutton switches.	On panel 437VU - OFF legends of PACK VALVE 1 and 2 pushbutton switches come on.
8. Depressurize pneumatic system	

(3)Close-up
(a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Restore system and aircraft to normal operating condition.

PACK FLOW CONTROL VALVE 69HB (68HB) - REMOVAL/INSTALLATION

WARNING : BEFORE UNDERTAKING MAINTENANCE OPERATION ON THE AIR CONDITIONING SYSTEM, MAKE CERTAIN THE PNEUMATIC SYSTEM IS DEPRESSURIZED.

NOTE : Removal/installation procedures of pack flow control valves 68HB and 69HB located in the air conditioning compartment are identical.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.6 m (8 ft. 6 in.)
B.	Torque Wrench - 0.75 to 0.85 m.daN (66.5 to 75 lbf.in.)
C.	Blanking Plugs/Caps
D.	Circuit Breaker Safety Clips
E.	O-Rings
F.	Warning Notices
G. Material No. 04-007	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 21-11-00, P. Block 501	Flow Control and Indicating
- 24-41-00, P. Block 301	AC External Power Control
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

R (Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP/PACK 1/WARN	201HB	203/G21
22VU	COMPT TEMP/PACK 1/VALVE	7HB	203/G22
22VU	COMPT TEMP/PACK 2/WARN	200HB	203/G25
22VU	COMPT TEMP/PACK 2/VALVE	6HB	203/G24

WARNING : DISPLAY WARNING NOTICES PROHIBITING PRESSURIZATION OF THE PNEUMATIC SYSTEM.

(2)Position access platform.

(3)Open main gear main door (Ref. 32-12-11, P. Block 301).

R (4)Remove air conditioning compartment access door 147BZ (148CZ).

B. Removal

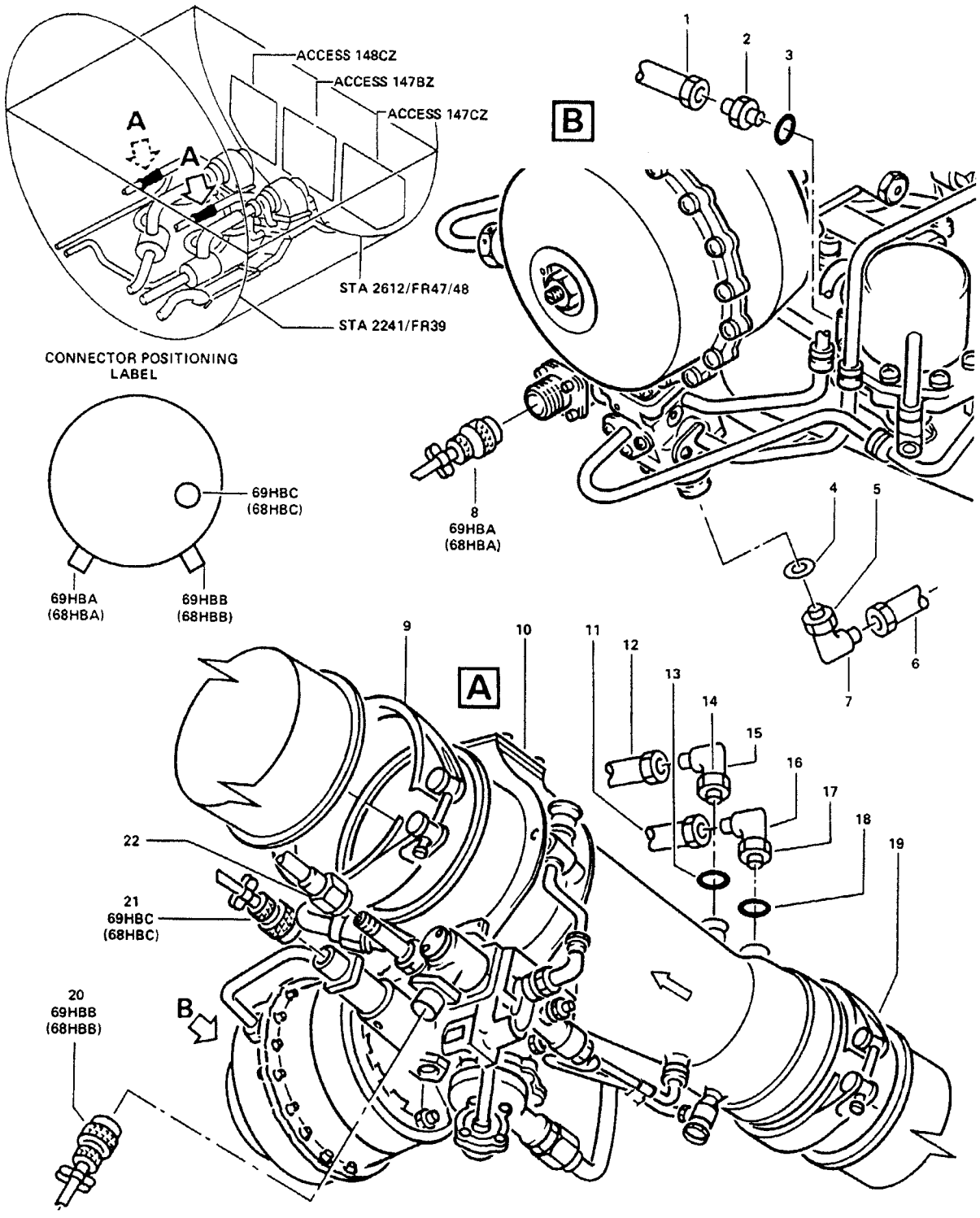
(1)Disconnect electrical connectors (8), (20) and (21).

(2)Disconnect sense lines (1), (6), (11), (12)and (22).

(3)Remove clamps (9) and (19).

(4)Remove flow control valve (10).

(5)Cap open ends of sense lines, ducts and electrical connectors (8), (20) and (21).



Pack Flow Control Valve 69HB (68HB)
Figure 401

R

C. Preparation of Replacement Component

(1)Clean elbows (7), (15) and (16) retained from removed valve and check for correct condition ; replace O-rings (4), (13) and (18), coat elbows threads with grease (Material No 04-007) and install on replacement valve.

NOTE : - Elbows (15) and (16) do not have an identical diameter.
- Do not tighten nuts (5), (14) and (17) of elbows.

(2)Clean union (2) retained from removed valve and check for correct condition ; replace O-ring (3), coat union threads with grease (Material No 04-007) and install on replacement valve.

D. Installation

(1)Remove blanking plugs/caps and check for correct condition of sense line ends, duct flanges and electrical connectors (8), (20) and (21).

(2)Clean and inspect pack flow control valve adjacent area.

(3)Install pack flow control valve (10) between ducts with arrow indicating airflow direction pointing towards refrigeration unit pack and valve mechanism directed downwards.

(4)Install clamps (9) and (19), tighten nuts ; TORQUE to the value given on clamps.

(5)Connect sense lines (1) and (22)

(6)Align elbows (7), (15) and (16) and connect sense lines (6), (11) and (12). Tighten nuts (5), (14) and (17) of corresponding elbows.

(7)Connect electrical connectors (8), (20) and (21).

NOTE : Connect the three electrical connectors as per location shown on label affixed to beam on which flow control valve is installed.

(8)Remove safety clips and tags and close circuit breakers 6HB, 7HB, 200HB and 201HB.

E. Test

(1)Perform operational test of flow control and indicating (ECON FLOW test) (Ref. 21-11-00, P. Block 501).

(2)Check for leakage when pack 1(2) flow control valve is selected (PACK VALVE 1 (PACK VALVE 2)) pushbutton switch pressed (in).

NOTE : Make sure that there are no leaks from connections of pack flow control valve during operational test.

F. Close-Up

(1)Remove all ground handling and maintenance equipment, standard and special tools together with ground power equipment, all access equipment and miscellaneous items.

CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/ PANELS AT FR47.

R (2)Install access door 147BZ (148CZ).

(3)Close main gear main door (Ref. 32-12-11, P. Block 301).

(4)Remove access platform.

(5)Remove warning notices.

(6)Restore aircraft and system to normal operating condition.

PACK FLOW CONTROL VALVE 69HB (68HB) - DEACTIVATION/REACTIVATION

Ref. : MEL Sect. 1-21, Item 4
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL
- IDENTIFY FAILED PACK FLOW CONTROL VALVE (TROUBLE SHOOTING).
WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Deactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.6 m (8 ft. 6 in.)
(2)	Circuit Breaker Safety Clips
(3)	Warning Notices
(4)	Blanking Plugs/Caps
(5)	Tape
(6)	Corrosion Resistant Steel Lockwire
Referenced Procedure - 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Procedure

R (Ref. Fig. 901)

(1)Job set-up

(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP/PACK 2/VALVE	6HB	203/G24
22VU	COMPT TEMP/PACK 1/VALVE	7HB	203/G22

(b)Open main gear door (Ref. 32-12-11, P. Block 301).

(c)Position access platform.

R (d)Remove access door 147BZ (148CZ).

(e)Display warning notices prohibiting pressurization of pneumatic system.

(2)Removal

(a)Disconnect electrical connector 69HB-A (68 HB-A).

(b)Cap electrical connectors.

(c)Stow electrical cable and connector 69HB-A (68HB-A) and secure with tape.

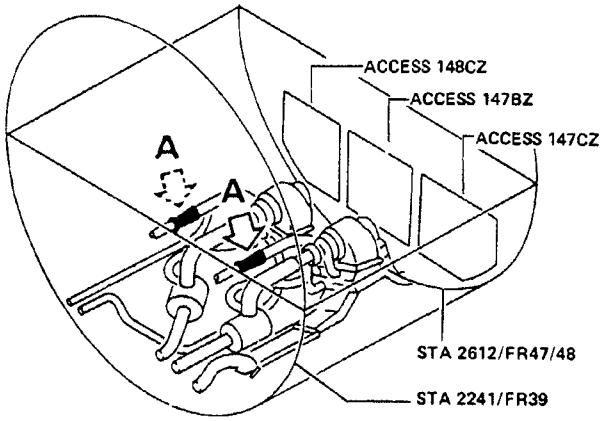
(d)Manually place pack flow control valve 69HB (68HB) in fully CLOSED position and secure manual override with lockwire.

(3)Close-up

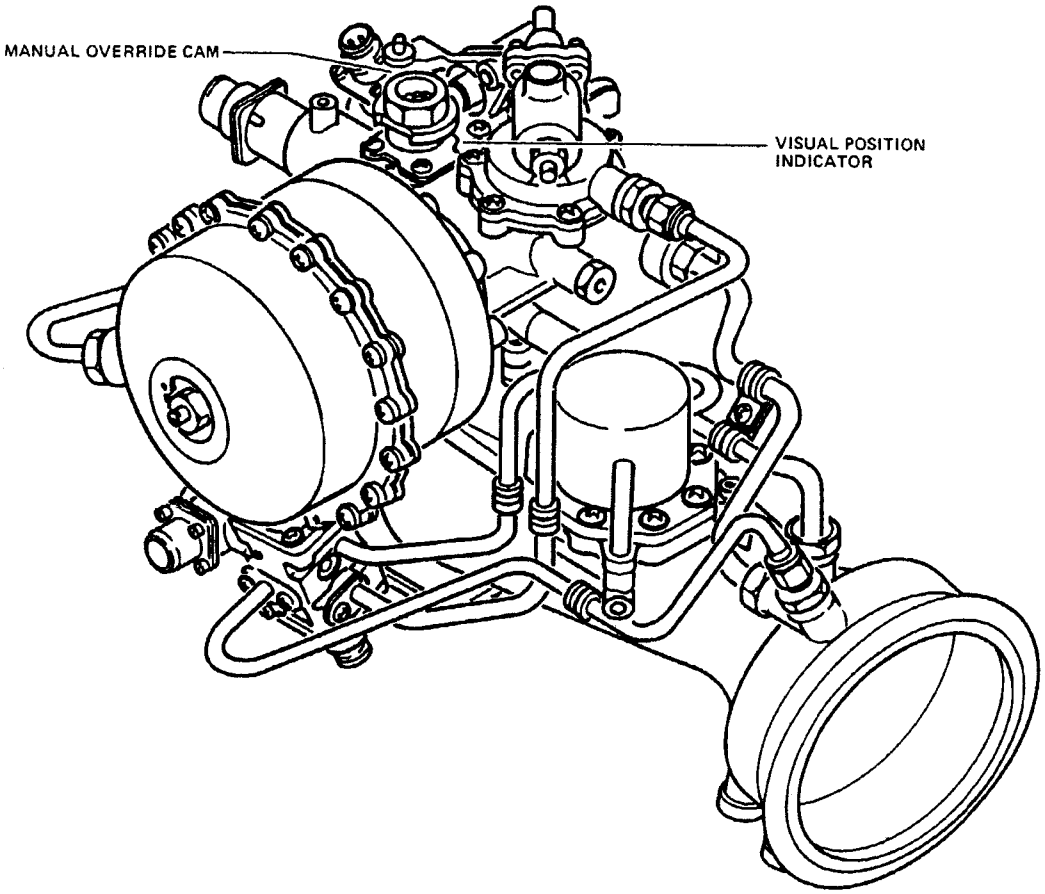
CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/ PANELS AT FR47.

R (a)Install access door 147BZ (148CZ).

(b)Remove access platform.



A



BM5 21 11 11 9 AAM0 12

R

Pack Flow Control Valve
Figure 901

(c)Close main gear door (Ref. 32-12-11, P. Block 301).
(d)Remove safety clips and tags and close ONE of the following circuit breakers : 7HB or 6HB.
NOTE : The circuit breaker for the deactivated valve is to be left open, safetied and tagged.
(e)Remove warning notices.
(f)Install a temporary placard in flight compartment to warn the flight crew that pack 1 (pack 2) flow control valve is deactivated.
(g)Remove all ground handling and maintenance equipment, standard and specials tools, together with ground power equipment, all access equipment and miscellaneous items.
(h)Make an entry in the aircraft technical log.

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.6 m (8 ft. 6 in.)
Referenced Procedure - 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

B. Procedure (Ref. Fig. 901)
(1)Job set-up
(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP/PACK 2/VALVE	6HB	203/G24
22VU	COMPT TEMP/PACK 1/VALVE	7HB	203/G22

(b)Open main gear door (Ref. 32-12-11, P. Block 301).
(c)Position access platform.
R (d)Remove access door 147BZ (148CZ).
(e)Display a warning notice prohibiting pressurization of pneumatic system.
(2)Installation
(a)Remove lockwire, turn manual override of pack flow control valve 69HB (68HB) to normal configuration and secure manual override with lockwire.
(b)Remove blanking caps from electrical plug and receptacle.
(c)Connect electrical connector 69HB-A (68HB-A).
(d)Remove safety clip and tag and close circuit breaker 6HB or 7HB.
(e)Troubleshoot the system (Ref. TSM 21-11-00).
(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/PANELS AT FR47.

R (b)Install access door 147BZ (148CZ).
(c)Remove access platform.
(d)Close main gear door (Ref. 32-12-11, P. Block 301).
(e)Remove warning notice and temporary placard.
(f)Clear technical log.

FLOW TRANSMITTER 13WV (14WV) - REMOVAL/INSTALLATION

WARNING : BEFORE UNDERTAKING MAINTENANCE OPERATION ON THE AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT THE PNEUMATIC SYSTEM IS DEPRESSURIZED.

NOTE : Removal/installation procedures of flow transmitter 13WV and 14WV located in air conditioning compartment are identical.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.6 m (8 ft. 6 in.)
B.	Blanking Plugs/Caps
C.	Circuit Breaker Safety Clips
D.	Corrosion Resistant Steel Lockwire (MS 20995C32).
Referenced Procedures	
- 12-33-21, P. Block 001	Pre-Conditioning
- 24-41-00, P. Block 301	AC External Power Control
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

2. Procedure
(Ref. Fig. 401)

**ON A/C 001-100,

Post SB 21-2052 For A/C 001-100,

(Ref. Fig. 402)

R **ON A/C 105-200,

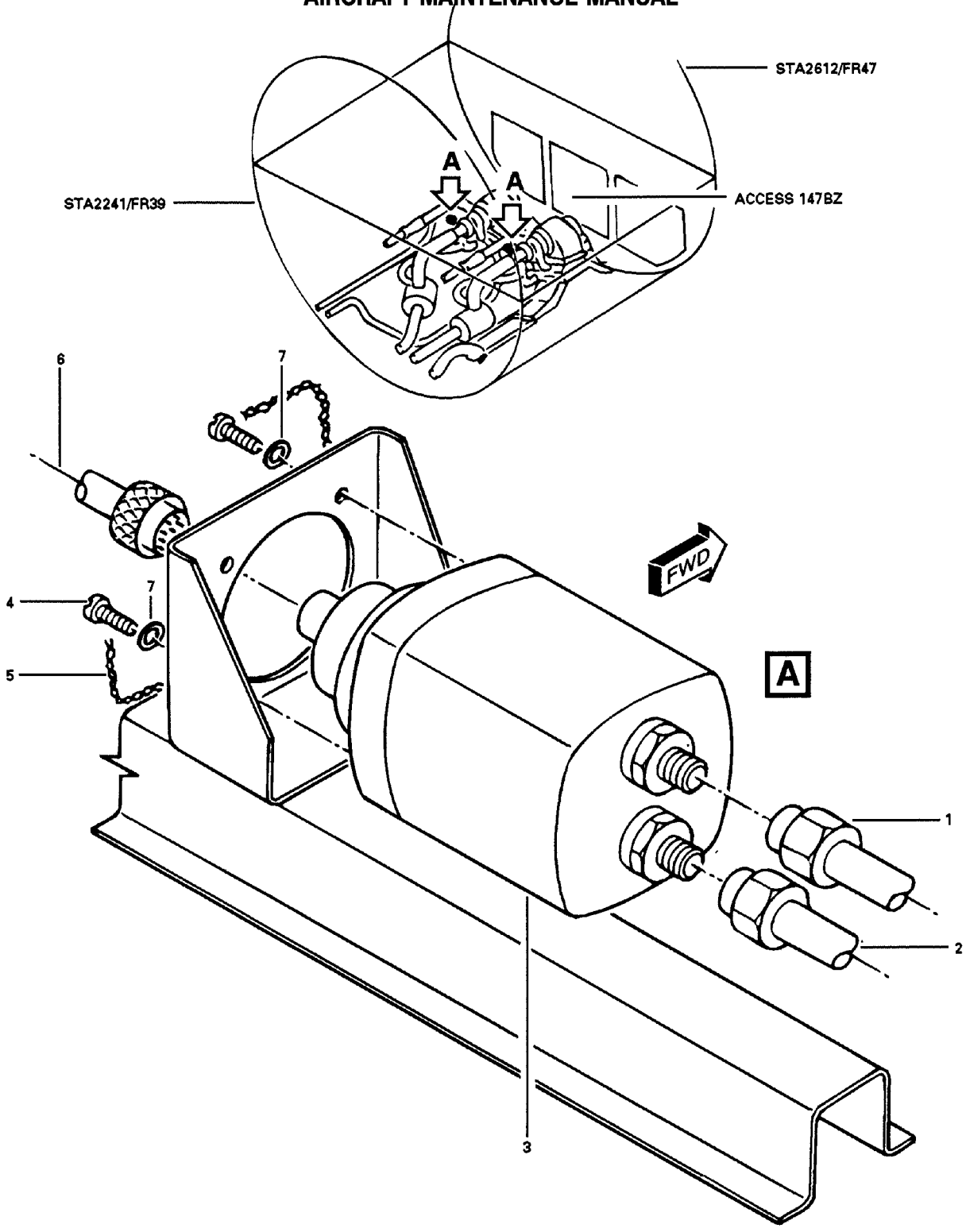
R Post SB 21-2052 For A/C 105-200,

R Post SB 21-2055 For A/C 105-200,

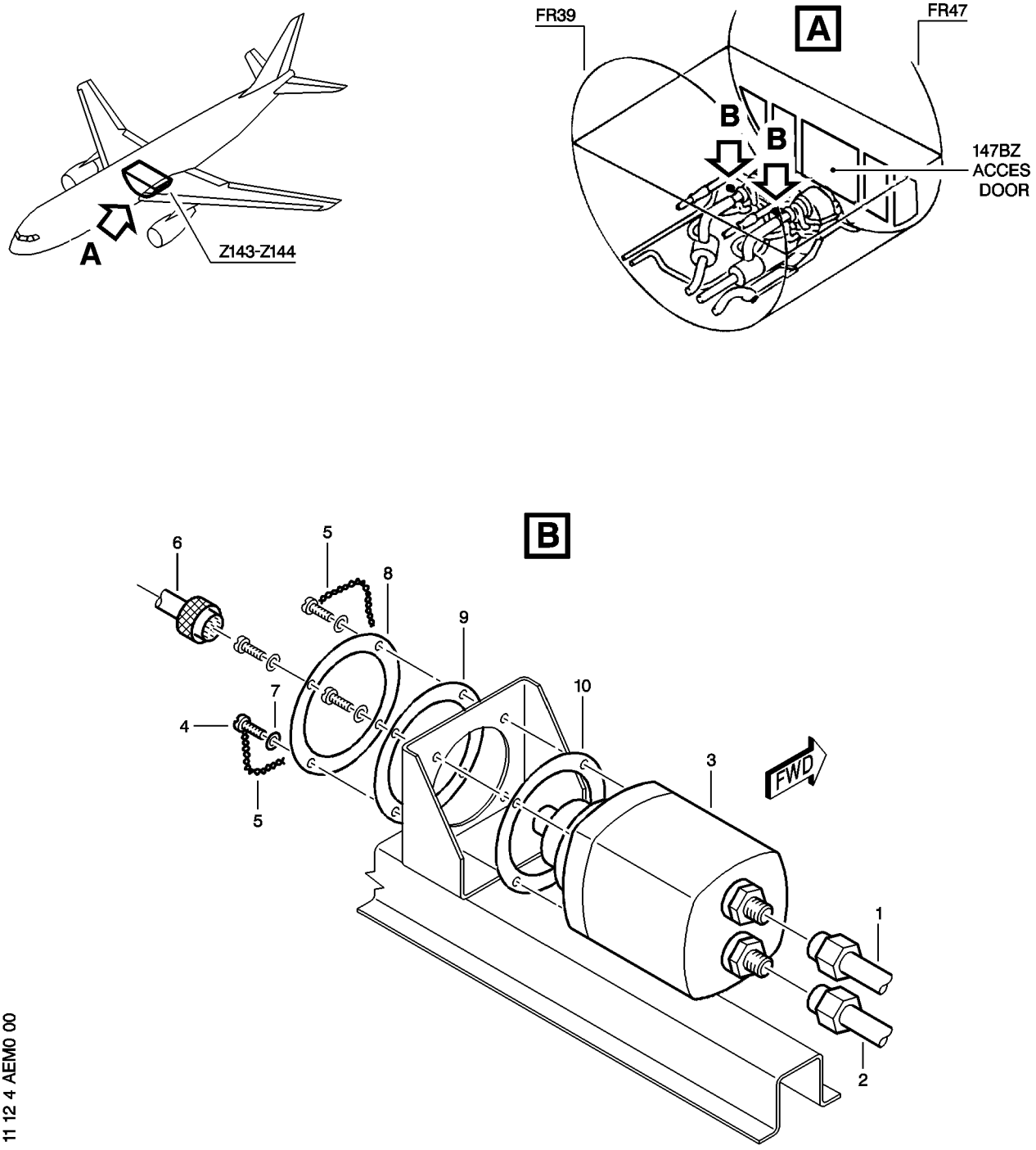
R (Ref. Fig. 403)

**ON A/C ALL

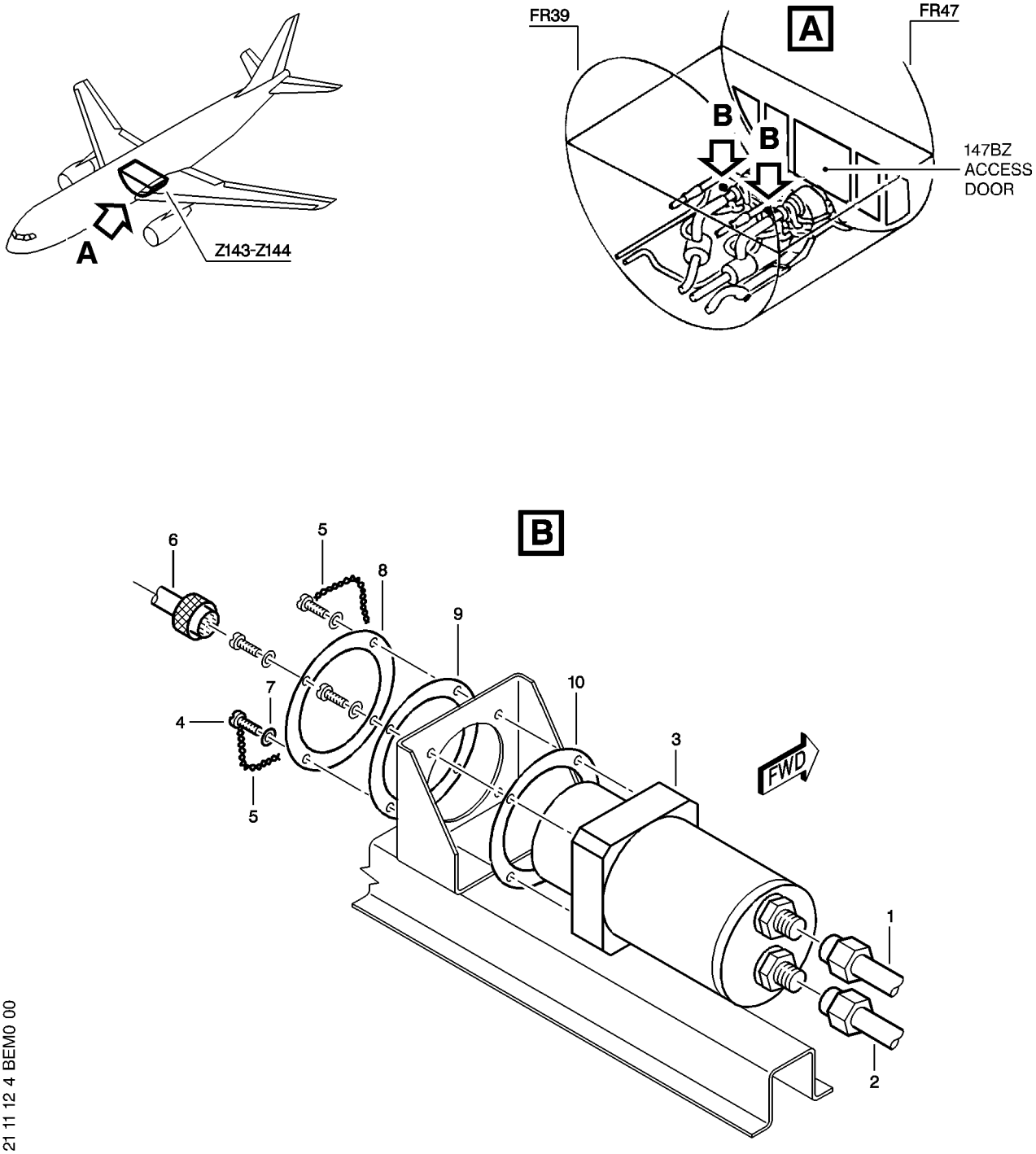
A. Job set-up
(1)Open, safety and tag the following circuit breaker :
(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)Make certain that circuit breakers are closed, particularly those associated with COMPT TEMP, HYDRAULIC (LDG GEAR PROX DET & RELAYS 2GB, 119GB) ECAM, AIR BLEED, AIR BLEED & COMPT TEMP and CABIN PRESS.



Flow Transmitter 13WV (14WV)
Figure 401



Flow Transmitter 13WV (14WV)
Figure 402



BM5 21 11 12 4 BEM0 00

Flow Transmitter 13WV (14WV)
Figure 403

PANEL	SERVICE	IDENT.	LOCATION
21VU	ECAM/SDAC/26VAC/ESS	5WV	109/A4

R
R

WARNING : DISPLAY WARNING NOTICES PROHIBITING PRESSURIZATION OF THE PNEUMATIC SYSTEM.

(5)Position access platform.
(6)Open main gear main door (Ref. 32-12-11, P. Block 301).
(7)Remove air conditioning compartment access door 147BZ.

B. Removal
(1)Disconnect electrical connector (6).
(2)Disconnect sense line(s) (1) and (2).
(3)Cut and remove lockwire (5); remove attachment screws (4) and washers (7).
(4)Remove flow transmitter (3).
(5)Cap open sense line(s) ends and electrical connector (6).

C. Installation
(1)Clean and inspect flow transmitter adjacent area.
(2)Remove blanking caps from sense line(s) and electrical connector (6).
(3)Install flow transmitter (3); install washers (7) and screws (4) tighten and wirelock.
(4)Connect sense line(s) (1) and (2).
(5)Connect electrical connector (6).

**ON A/C 001-100, 105-200,

Post SB 21-2052 For A/C 001-100,105-200,

Post SB 21-2055 For A/C 105-200,

B. Removal
(1)Disconnect electrical connector (6).
(2)Disconnect sense line(s) (1) and (2).
(3)Cut and remove lockwire (5); remove attachment screws (4) and washers (7).
(4)Remove plate (8), seal (9) and discard seal.
(5)Remove flow transmitter (3), seal (10) and discard seal.
(6)Cap open sense line(s) (1) and (2) ends and electrical connector (6).

C. Installation
(1)Clean and inspect flow transmitter adjacent area.
(2)Remove blanking plugs/caps from sense lines (1) and (2) and electrical connector (6).
(3)Install new seal (10) and flow transmitter (3).

(4)Install new seal (9) and plate (8).
(5)Install washers (7) and screws (4), tighten and wirelock.
(6)Connect sense lines (1) and (2).
(7)Connect electrical connector (6).

**ON A/C ALL

D. Test

ACTION	RESULT
1. Pressure pneumatic system : - with APU or HP ground air supply unit (Ref. 12-33-21, P. Block 001).	
2. On COMPT TEMP panel 437VU : - press PACK VALVE 1(2) pushbutton switch	On panel 437VU : - OFF legend on PACK VALVE 1(2) pushbutton switch goes off. On right ECAM display unit, on AIR BLEED page : - pack 1(2) flow indicating arrow moves.
3. On COMPT TEMP PANEL 437VU : - release PACK VALVE 1(2) pushbutton switch	On panel 437VU : - OFF legend on PACK VALVE 1(2) pushbutton switch comes on.
4. Depressurize pneumatic system (Ref. 12-33-21, P. Block 001).	

E. Close-up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment
CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/ PANELS AT FR47.
(2)Install air conditioning compartment access door 147BZ.
(3)Close main gear main door (Ref. 32-12-11, P. Block 301).
(4)Remove access platform.
(5)Remove warning notices.
(6)Remove safety clip and tag and close circuit breaker 5WV.
(7)Restore system and aircraft to normal operating condition.
(8)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

DISTRIBUTION - DESCRIPTION AND OPERATION

1. General

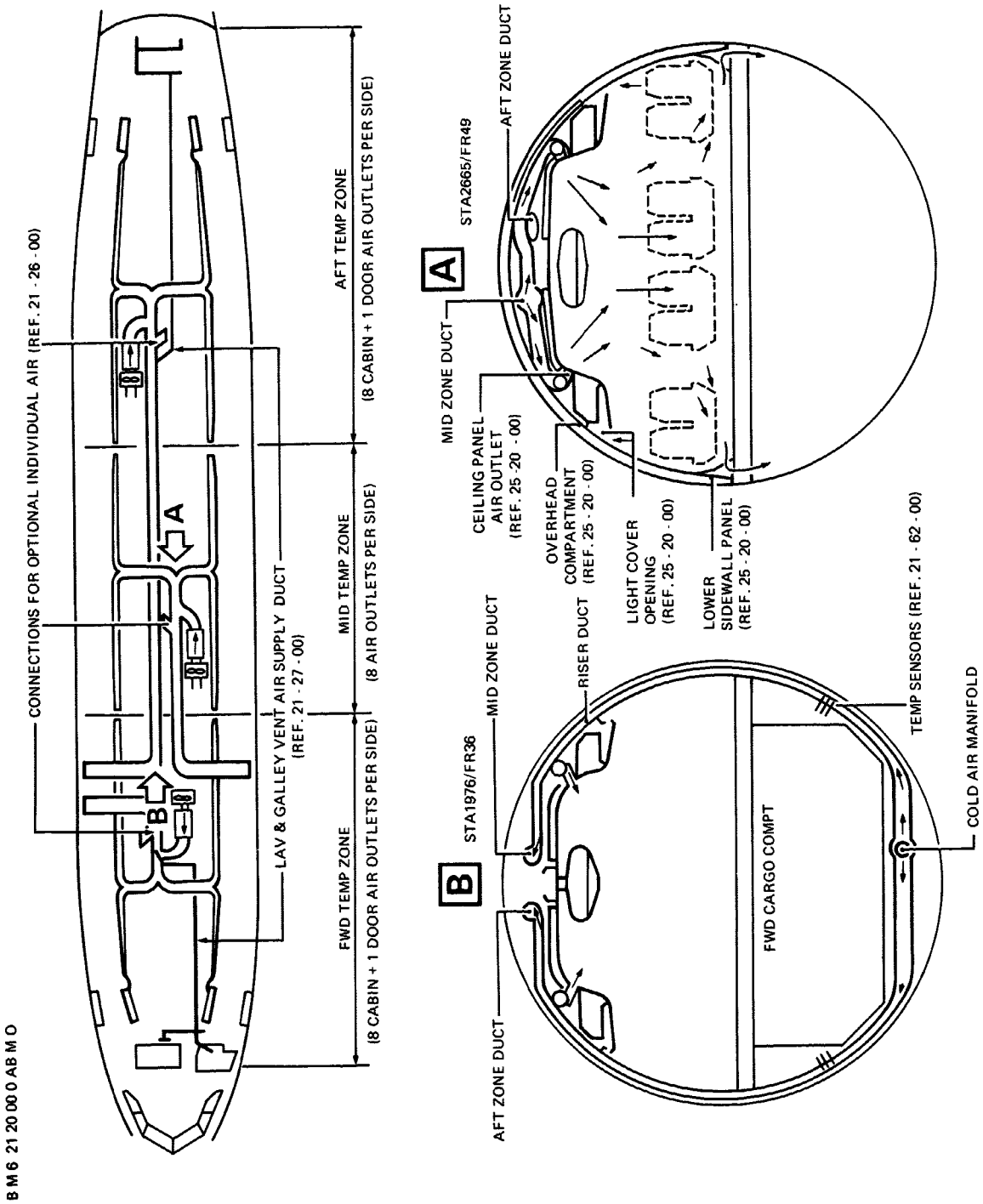
(Ref. Fig. 001)

The distribution system provides a means of circulating the conditioned air within the pressurized fuselage compartments and then venting it either from one zone to another or overboard through outflow valves. Conditioned air from the packs is fed into a common cold air manifold and then ducted towards the flight compartment (cockpit) and passenger compartment (cabin). For the best temperature control, the cabin is divided into three independent zones. Unconditioned hot air is extracted downstream of each pack flow control valve and fed into a common hot air manifold. This air is then used to 'trim' the pack output air to the desired individual zone temperature as regulated by the temperature control system. Air distribution takes place through the main cabin distribution ducting, the cockpit ducting and individual ventilation to the lavatories and galleys. As an option, conditioned, fresh air is also distributed through the passenger individual ventilation outlets. Electric fans are used in each of the cabin zones to recirculate the cabin air back through the zone main distribution ducting to be mixed with fresh air. The cockpit and cabin air is then extracted to the compartments below the floor through floor level vents in the cabin walls or vented directly overboard through the lavatory and galley ventilation system.
The air extracted from the above-floor compartments is used for electrical and electronic rack cooling, for heating and venting the cargo compartments and for general ventilating of the below-floor area within the pressurized fuselage. The air is then passed overboard through outlet valves which regulate the overall pressure in the fuselage.
A smoke detection system (Ref. 26-10-00) operates in conjunction with the distribution system in the underfloor area.

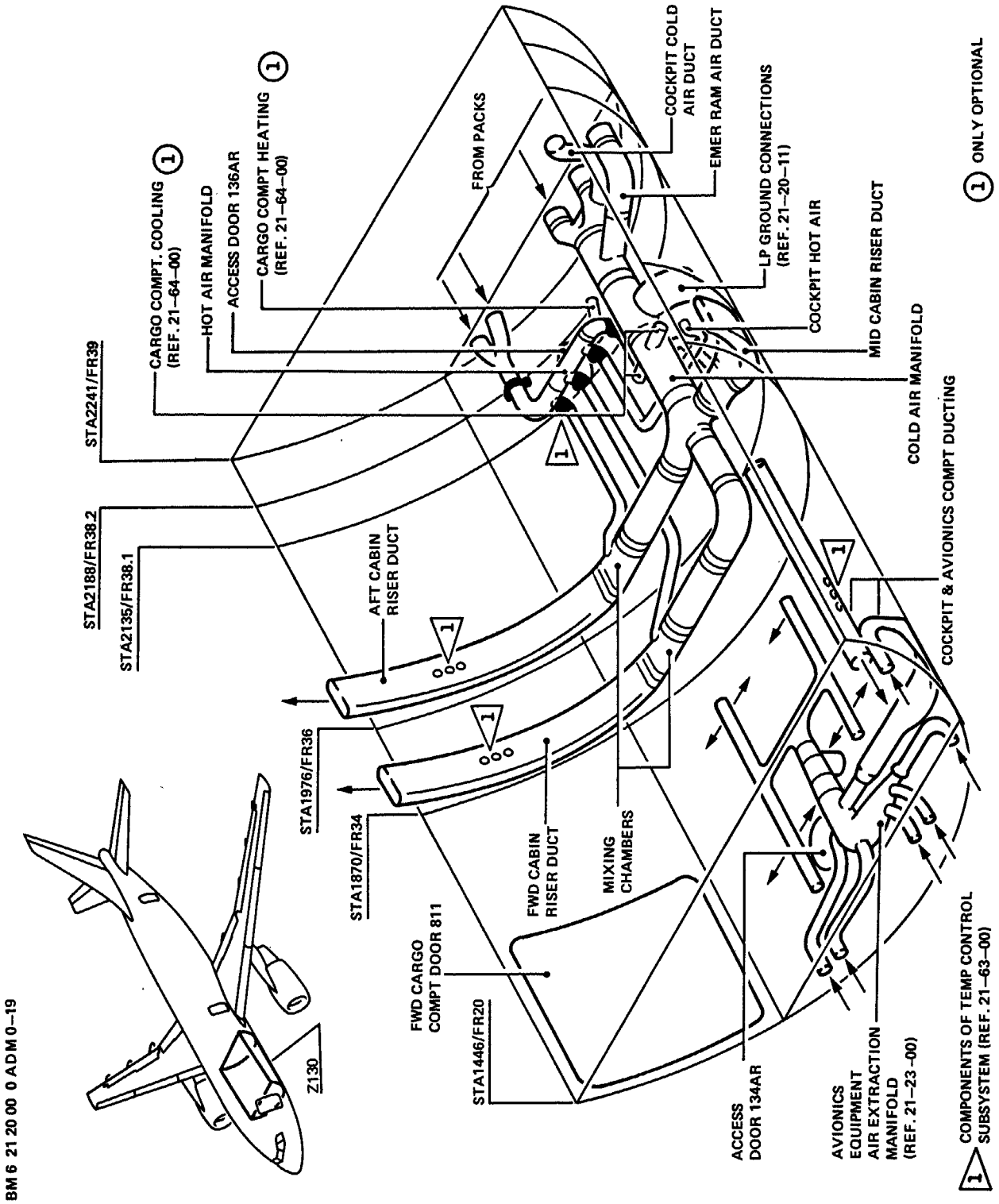
2. Main Distribution Ducting

(Ref. Fig. 002)

Hot and cold air manifolds located under the FWD cargo compartment floor are utilized to mix and distribute the conditioned air.
Cold air from the air conditioning packs is routed through check valves to the cold air manifold where it is then divided among four ducts leading to the cockpit and three cabin zones. Hot air, supplied from downstream of the flow control valves, is routed through check valves and a pressure regulator to the hot air manifold. Trim air valves operated by the temperature control system (Ref. 21-60-00) then regulate the amount of hot air delivered to the separate cockpit and cabin zone air mixing chambers. Additionally, air from the hot air mainfold is routed to the cargo compartment ventilation ducting.


B M 6 21 20 00 0 AB M O
CONNECTIONS FOR OPTIONAL INDIVIDUAL AIR (REF. 21 - 26 - 00)
LAV & GALLEY VENT AIR SUPPLY DUCT (REF. 21 - 27 - 00)
AFT TEMP ZONE
(8 CABIN + 1 DOOR AIR OUTLETS PER SIDE)
MID TEMP ZONE
(8 AIR OUTLETS PER SIDE)
FWD TEMP ZONE
(8 CABIN + 1 DOOR AIR OUTLETS PER SIDE)
A
B
STA2665/FR49
AFT ZONE DUCT
MID ZONE DUCT
CEILING PANEL AIR OUTLET (REF. 25 - 20 - 00)
OVERHEAD COMPARTMENT (REF. 25 - 20 - 00)
LIGHT COVER OPENING (REF. 25 - 20 - 00)
LOWER SIDEWALL PANEL (REF. 25 - 20 - 00)
STA1976/FR36
MID ZONE DUCT
RISER DUCT
AFT ZONE DUCT
FWD CARGO COMPT
TEMP SENSORS (REF. 21 - 62 - 00)
COLD AIR MANIFOLD

Cabin Distribution Ducts
Figure 001



Main Distribution Ducting
Figure 002

LP GROUND CONNECTOR BLOCKING DEVICE- REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED. DISPLAY A WARNING NOTICE PROHIBITING ENGINE START UP. DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 3 m (10 ft.)
B.	Blanking Caps

Referenced Procedures

- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors
- 21-51-00, P. Block 501	Air Cooling System

2. Procedure

(Ref. Fig. 401)
(Ref. Fig. 402, 403)

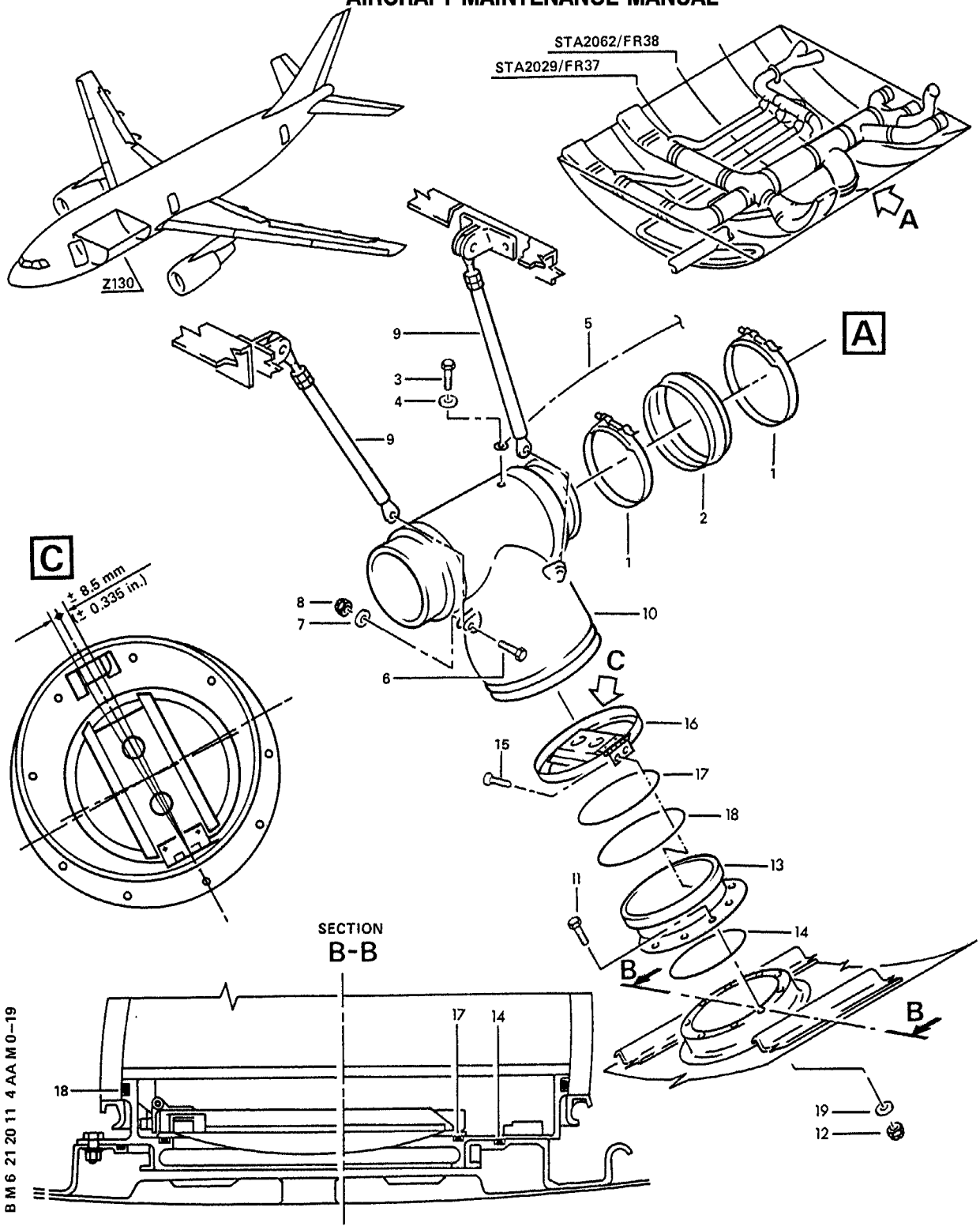
A. Job Set-Up
(1)Position access platform.
(2)Open FWD cargo compartment door and secure with safety lock (Ref. 52-30-00, P. Block 301).
(3)Open access panel 136AR.

(4)Remove cargo compartment floor panel ZF.

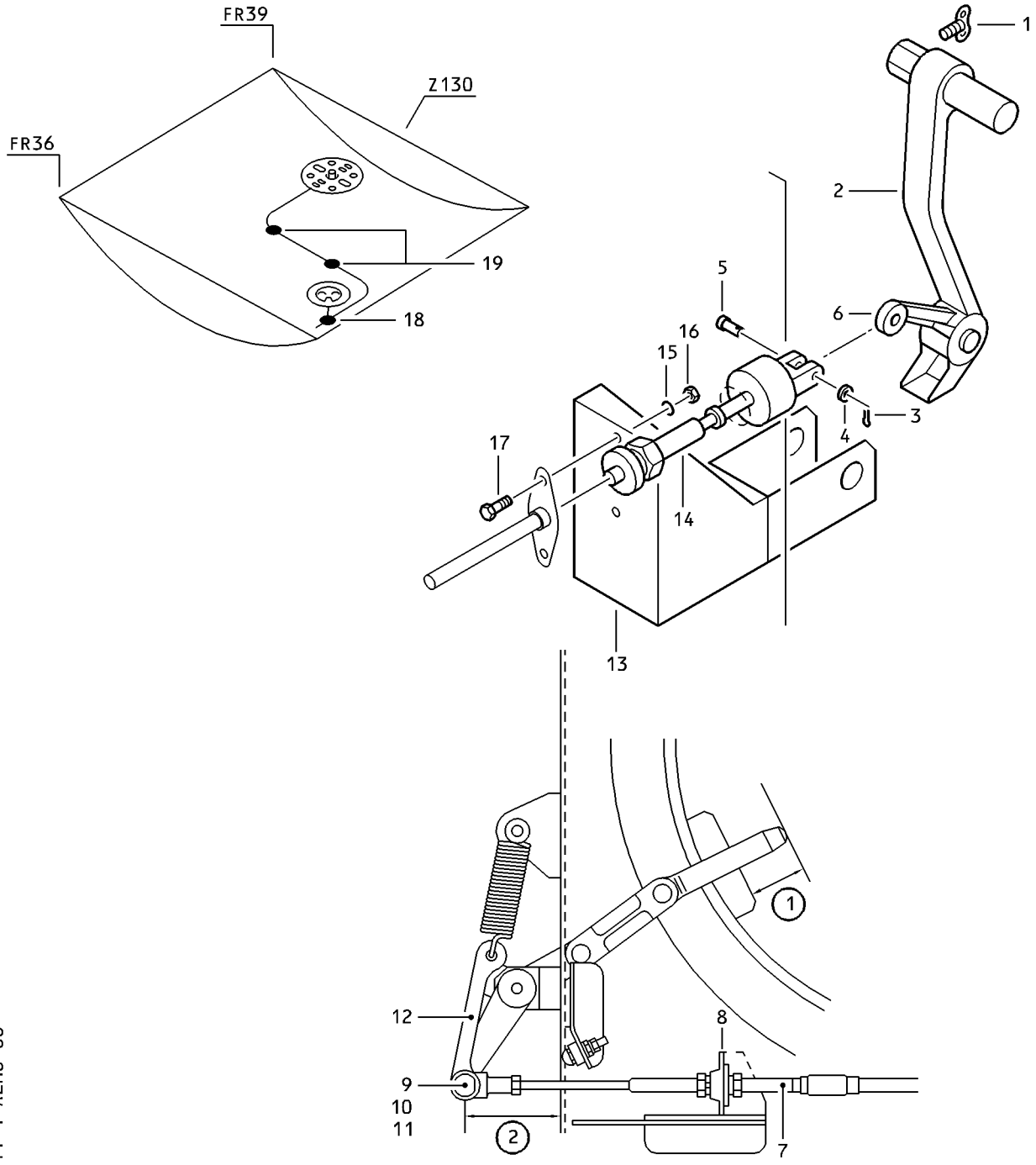
B. Removal of LP Ground Connector
(1)Remove clamps (1).
(2)Free sleeves (2) from duct (10).
(3)Remove screw (3), washer (4) and disconnect bonding strap (5).
(4)Support duct (10).
(5)Remove nuts (8), washers (7) and bolts (6).
(6)Displace rods (9) from duct (10).
(7)Lift duct (10) from ground connector and remove.
(8)Remove bolts (11), nuts (12), sealing rings (19) and ground connector (13).
(9)Remove and retain O-rings (14, 17, 18).

C. Preparation of Replacement Components
(1)Check ground connector for integrity.
(a)Check that flap movement is not more than ± 8,5 mm (± 0.335 in.) either side of centerline, opposite the hinge.
(2)Check O-rings for serviceability and replace, if necessary.

D. Installation of LP Ground Connector
(1)Install O-ring (17, 18).



LP Ground Connector
Figure 401



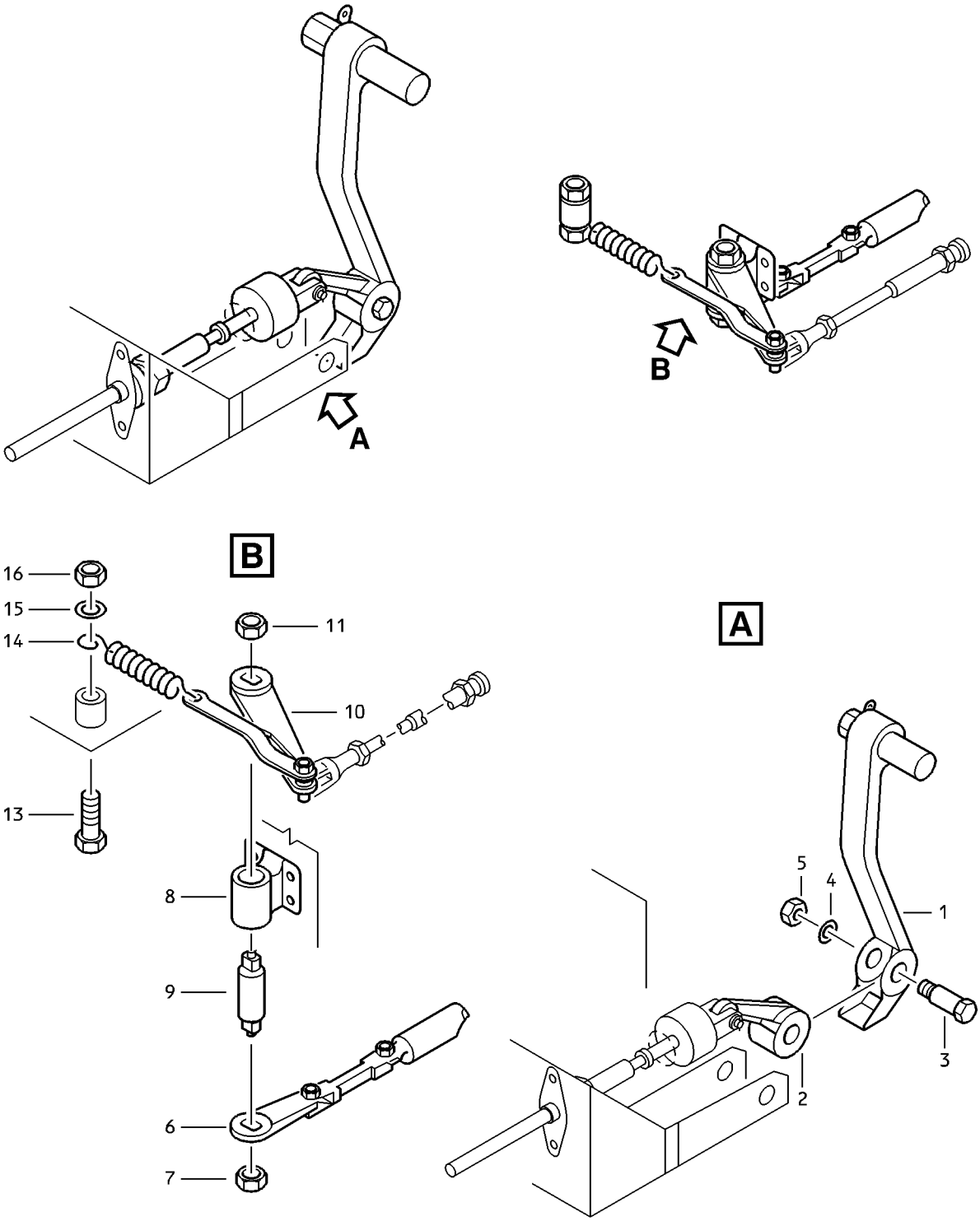
BM6 21 20 11 4 ALMO 00

(1) PROTRUSION. 10.5mm (0.42in.) MAX WITH HANDLE PULLED

(2) DIMENSION. 50.9mm (2.04in.) CABLE SHOWN WITH HANDLE IN ENGAGED POSITION

Blocking Device
Figure 402

R



Blocking Device
Figure 403

R

(2)Position O-ring (14).
(3)Position ground connector (13).
(4)Install sealing rings (19), nuts (12) and bolts (11).
(5)Position and support duct (10).
NOTE: Do not damage O-ring (18).
(6)Position rods (9) and install bolts (6), washers (7) and nuts (8).
(7)Position sleeves (2) and install clamps (1).
(8)Install bonding strap (5) with washer (4) and screw (3).

E. Removal of Blocking Device Cable
(Ref. Fig. 402)
(1)Release fastener (1)
(2)Lower handle (2) down to get access to cable.
(3)Remove cotter pin (3), washer (4) and pin (5).
(4)Lower handle (2) fully down.
R (5)Remove nuts (16), washers (15), bolts (17) and disconnect cable end (14) from bracket (13).
(6)Release clamps (19).
(7)Remove cotter pin (9), washer (10) and pin (11).
(8)Disconnect cable end (7) from bracket (8).
(9)Release clamp (18) and remove cable from aircraft.

F. Removal of Handle and Linkage
(Ref. Fig. 403)
(1)Remove nut (5), washer (4) and bolt (3).
(2)Remove handle (1) and link (2).
(3)Remove nuts (11) and (7).
(4)Pull top lever (10) free from pivot pin (9).

(5)Remove lower lever (6) complete with lock pin.

(6)Remove pivot pin (9) from support (8).
(7)Remove nut (16), washer (15), spring (14), lever (12) and bolt (13).

G. Preparation for Installation
(1)Check cable for broken strands, flat spots, swaged ends are secure and end fittings for wear.
(2)Check cable runs smoothly through outer cover and has lubrication.
(3)Check spring is not stretched or distorted.
(4)Check all pivot points, links and pins are in good condition.
(5)Check handle and securing fastener are in good condition.

H. Installation of Handle and Linkage
(Ref. Fig. 403)
(1)Position handle (1) with link (2).
(2)Install bolt (3), washer (4) and nut (3).
(3)Install spring with bolt (13), washer (15) and nut (16).
(4)Attach levers (12) and (10).
(5)Install pivot pin (9) in support (8).

(6)Position lower lever (6) with lock pin.
NOTE : Make certain that lock pin is located in guide and cutout in lock pin faces down.

(7)Attach lower lever (6) to pivot pin (9) and install nut (7).
(8)Attach top lever (10) to pivot pin (9) and install nut (11).
NOTE : Make certain that pivot pin (9) moves freely.
(9)Position handle (1) and install bolt (3), washer (4) and nut (5).

J. Installation of Blocking Device Cable
(Ref. Fig. 402)
(1)Position cable in aircraft.
(2)Install cable end (7) in bracket (8).
(3)Attach cable (7) to lever (12) with pin (9), washer (10) and secure. with new cotter pin (11).
(4)Position cable end (14) in bracket (13).
R (5)Install bolts (17), washers (15) and nuts (16).
(6)Attach cable end (14) to link (6) and put pin (5) in position, do not secure at this time.
(7)Position clamps (18) and (19), do not tighten at this time.
(8)Adjust cable to the required settings with handle in correct position for each adjustment.
CAUTION : MAKE CERTAIN THAT ADJUSTER IS IN SAFETY BEFORE LOCKING.
(9)Tighten clamps (18) and (19).
(10)Secure pin (5) with washer (4) and new cotter pin (3).
(11)Stow handle and make sure the fastener (1) secures the handle (2).

(12)Operate the handle and check function and correct engagement of the pin.

(13)Install panel 136AR.

R K. Test
(1)Operate air cooling system (Ref. 21-51-00, P. Block 501).
(2)Check duct manifold assy (10) and duct connections for leakage.
Leaks are not permissible.

R L. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Install cargo compartment floor panel ZF.

(3)Remove safety lock and close FWD cargo compartment door (Ref. 52-30-00, P. Block 301).
(4)Remove access platform.

L GROUND CONNECTION - INSPECTION/CHECK

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED. DISPLAY A WARNING NOTICE PROHIBITING ENGINE START UP. DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.

1. Reason for the Job

Inspection of low pressure ground connection cover assembly.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 3 m (10 ft.)
B.	Blanking Caps
Referenced Procedures	
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors
- 21-20-11, P. Block 401	LP Ground Connector Blocking Device
- 21-51-00, P. Block 501	Air Cooling system

3. Procedure

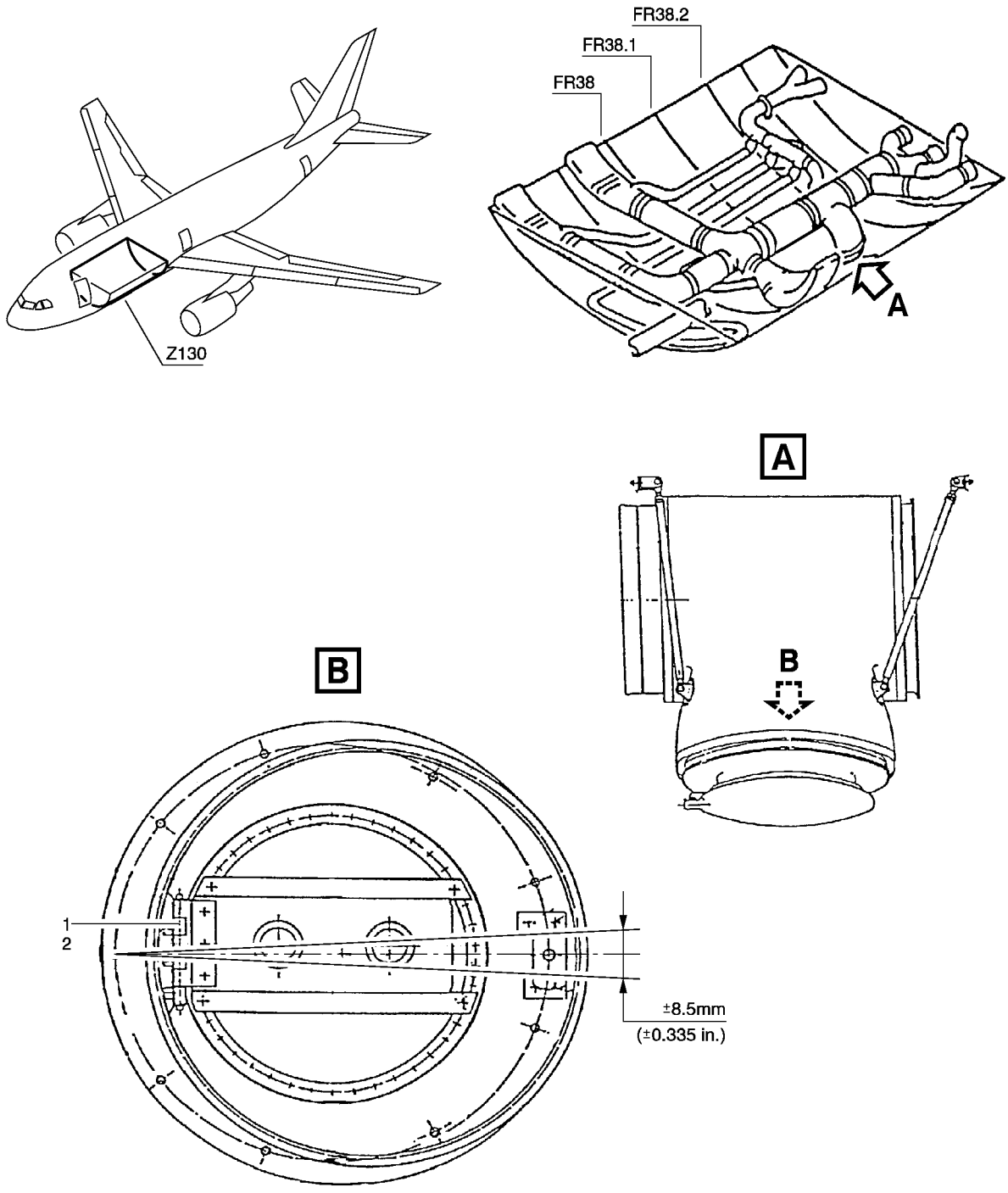
(Ref. Fig. 601)

A. Job Set-Up
  (1)Position access platform.
  (2)Open FWD cargo compartment door and secure with safety lock (Ref. 52-30-00, P. Block 301).
  (3)Open access panel 136AR.
  (4)Remove cargo compartment floor panel 137 ZF.
  (5)Remove LP ground connector cover assemblies (Ref. 21-20-11, P. Block 401).

B. Inspection
  (1)Do a visual check of the piano hinges (1) and (2) for damages.
  (2)Check ground connector for integrity.
    (a)Check that flap movement is not more than ± 8,5 mm (± 0.355 in.) either side of centerline, opposite the hinge.
  (3)Check O-rings for serviceability and replace, if necessary.
  (4)Install LP ground connector cover assemblies (Ref. 21-20-11, P. Block 401).

C. Test
  (1)Operate the air cooling system (Ref. 21-51-00, P. Block 501).
    (a)Check duct manifold assy and duct connections for leakage. Leaks are not permissible.

D. Close-Up
  (1)Make sure that working area is clean and clear of tools and other items.



Ground Connector
Figure 601

(2)Install cargo compartment floor panel 137 ZF.
(3)Remove safety lock and close the FWD cargo compartment door (Ref. 53-10-29, P. Block 401).
(4)Remove the access platform.

FLIGHT COMPARTMENT AND ELECTRONICS RACKS AIR DISTRIBUTION
DESCRIPTION AND OPERATION

1. General

The system ensures distribution of conditioned air to the flight compartment and ventilation of the electric and electronic equipment.
Conditioned air is bled from a hot air manifold and a cold air manifold supplied by the refrigeration unit packs.
Ventilation of the electric and electronic equipment is ensured from the following sources :

- on the ground without air conditioning, by air bled from the exterior through the open access door of the avionics compartment or by ambient air if the door is closed.
- on the ground with air conditioning and in flight, by a mixture of conditioned air and ambient air from the flight compartment.

Air is blown through and around the equipment and then evacuated by the electronics racks air extraction system (Ref. 21-23-00).

2. Component Location

(Ref. Fig. 001)

R **ON A/C 001-100,

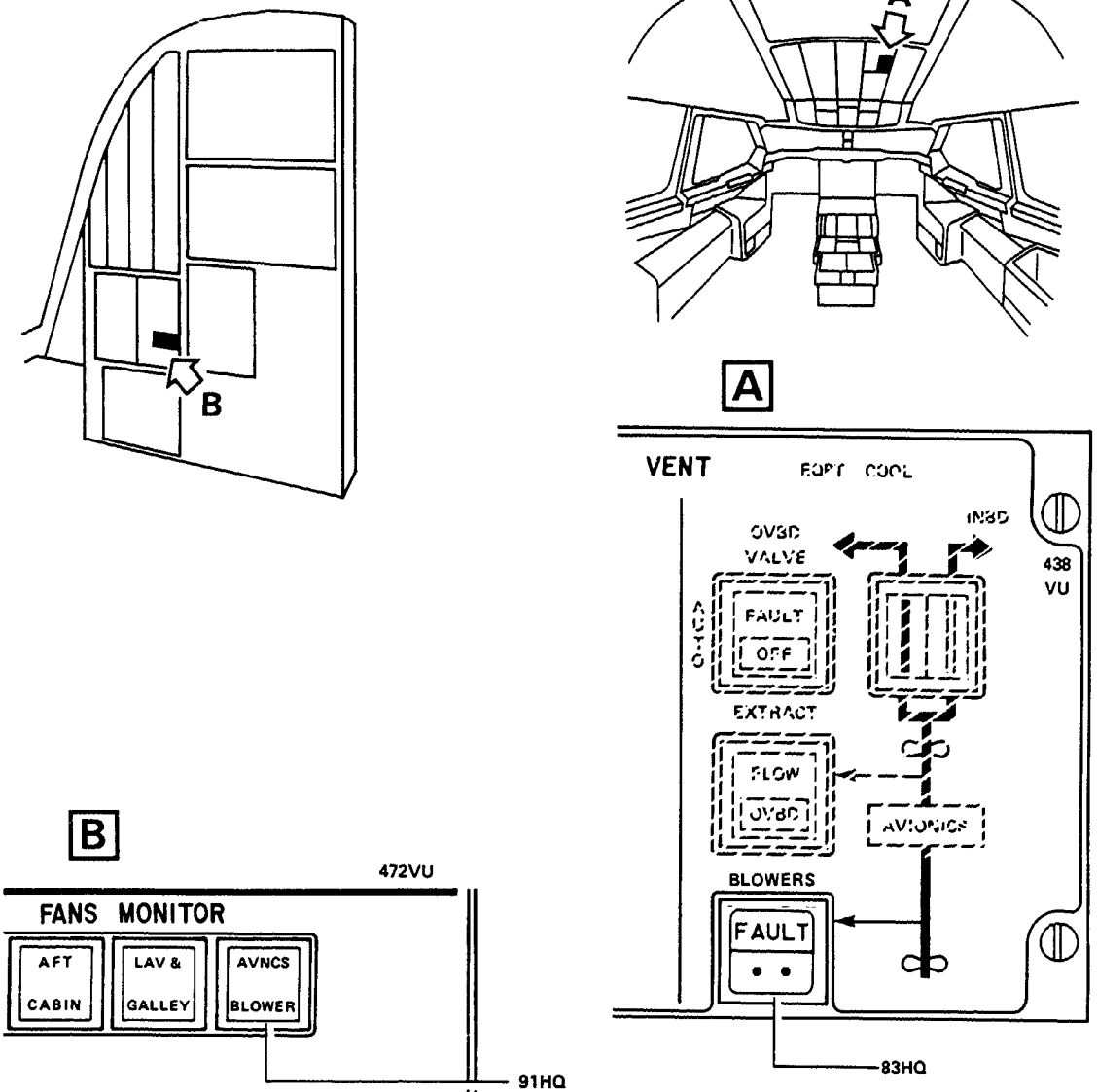
(Ref. Fig. 002)

R **ON A/C 101-200,

(Ref. Fig. 003)

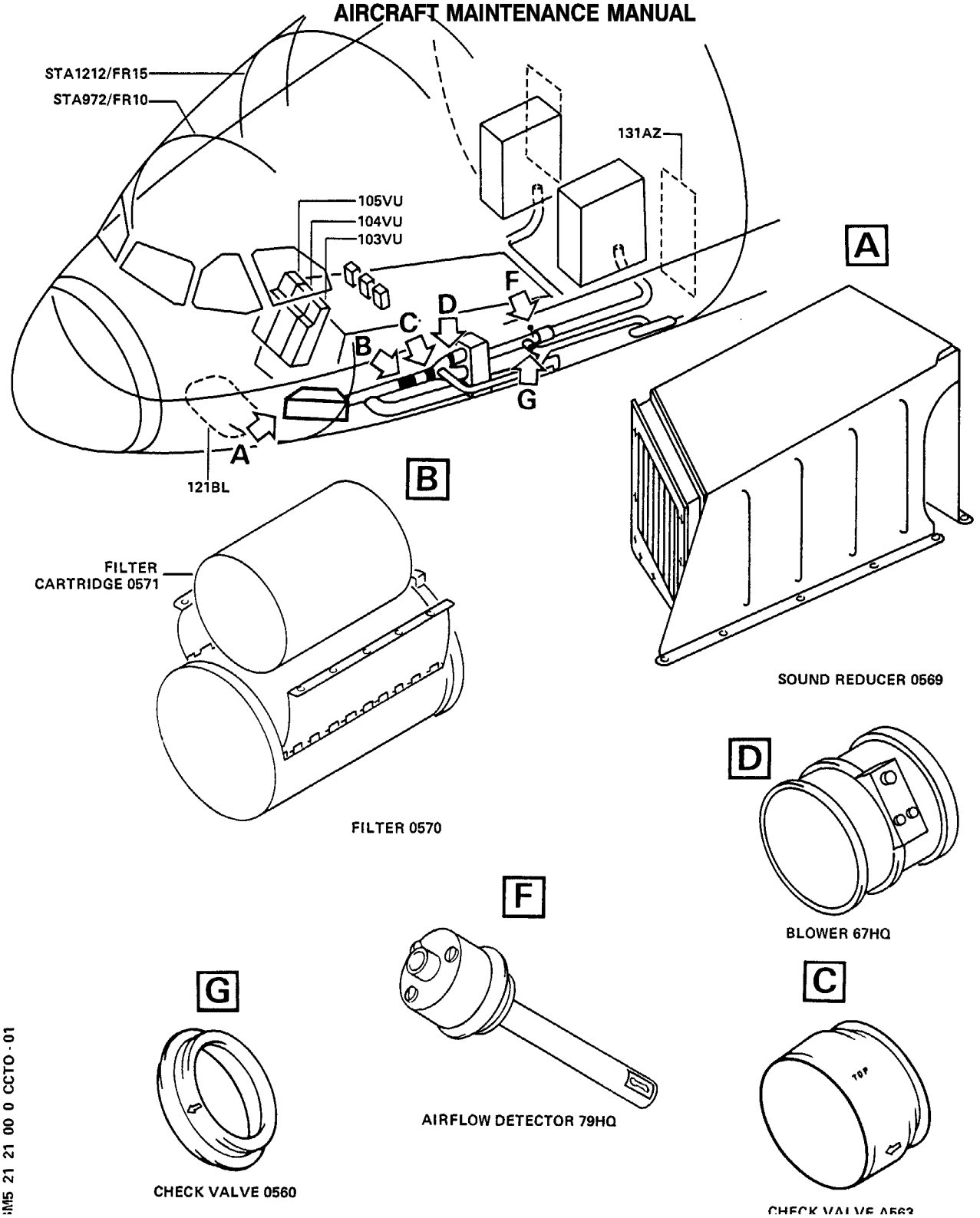
R **ON A/C ALL

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
67HQ	BLOWER - AVIONICS		121	121BL	21-21-11
79HQ	DETECTOR - AIRFLOW AVIONICS BLOWER		121	121BL	21-21-12
83HQ	P/BSW - VENT/EQPT COOL/BLOWER	438VU	212		21-21-00
91HQ	MFA - FANS MONITOR/AVNCS BLOWER	472VU	212		21-21-00
0560	CHECK VALVE - AIR CONDITIONING		121	121BL	21-21-14
A563	CHECK VALVE - AIR SUPPLY		121	121BL	21-21-13
0569	REDUCER - SOUND		121	121BL	21-21-15
0570	FILTER		121	121BL	21-21-16
0571	CARTRIDGE - FILTER		121	121BL	21-21-16

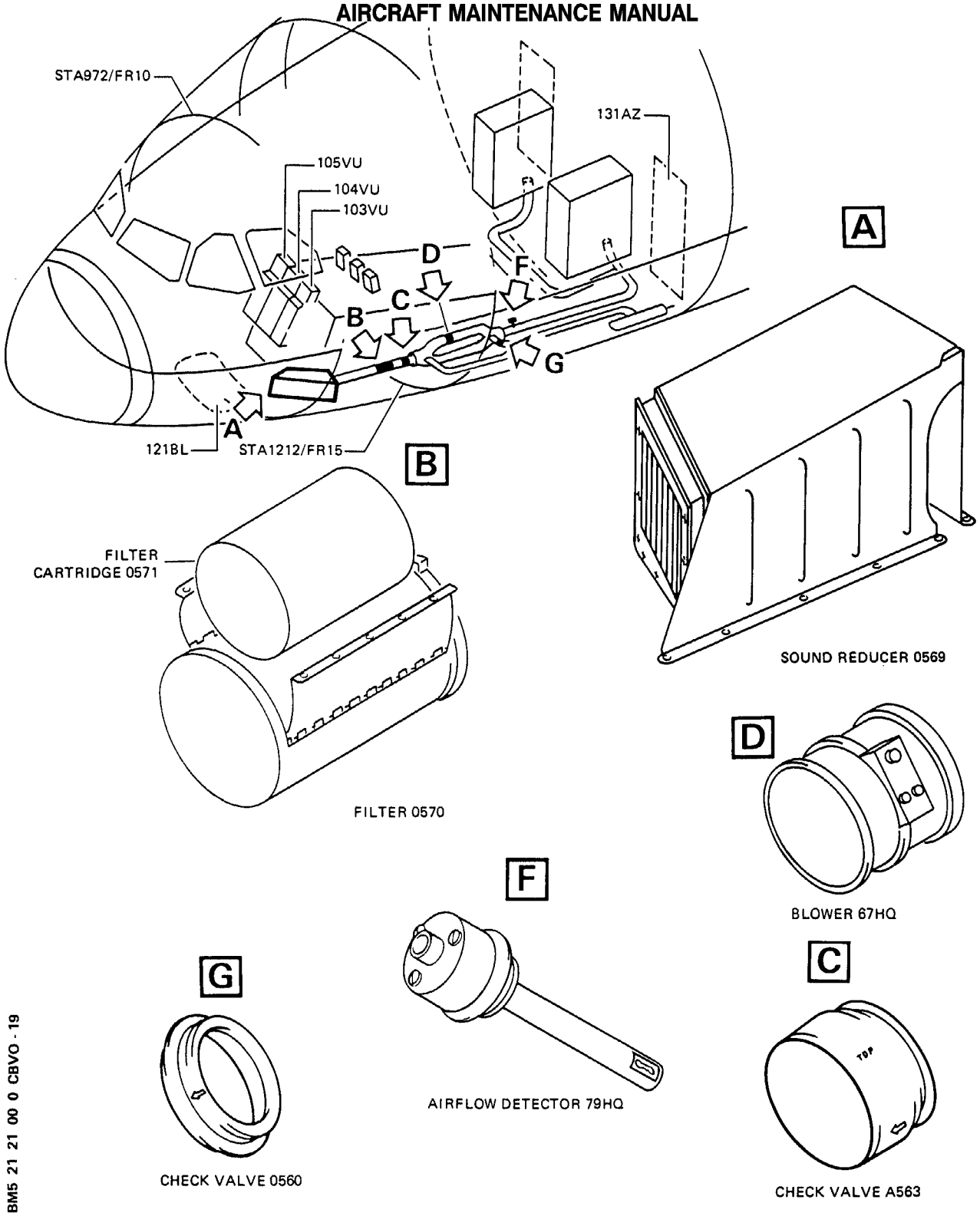


BM5 21 21 00 0 CATO.13

Control and Indicating - Location
Figure 001



Electronics Racks Air Distribution - Component Location
Figure 002



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Electronics Racks Air Distribution - Component Location
Figure 003

3. Description

A. Flight Compartment Air Distribution
(Ref. Fig. 004)
The distribution system comprises a main supply duct connected to the hot and cold air manifolds and located under the forward cargo compartment floor; this main duct is routed upward along the fuselage left wall and directs air to the following components in the flight compartment :
- a ventilation bar located below the windshield panels
- an air outlet located in the ceiling.
- an air outlet located at floor level, on the left
- four individual air outlets at each crew member station.

The amount of airflow delivered by the ventilation bar below the windshield panels, the ceiling air outlet and the floor air outlet is adjustable through flaps manually controlled by handles.
Approximately 30% airflow is maintained from the floor and ceiling outlets when associated controls are in minimum flow stop position.
The four individual air outlets are adjustable for flow and direction.

B. Electronics Racks Ventilation

R **ON A/C 001-100,

(Ref. Fig. 005)

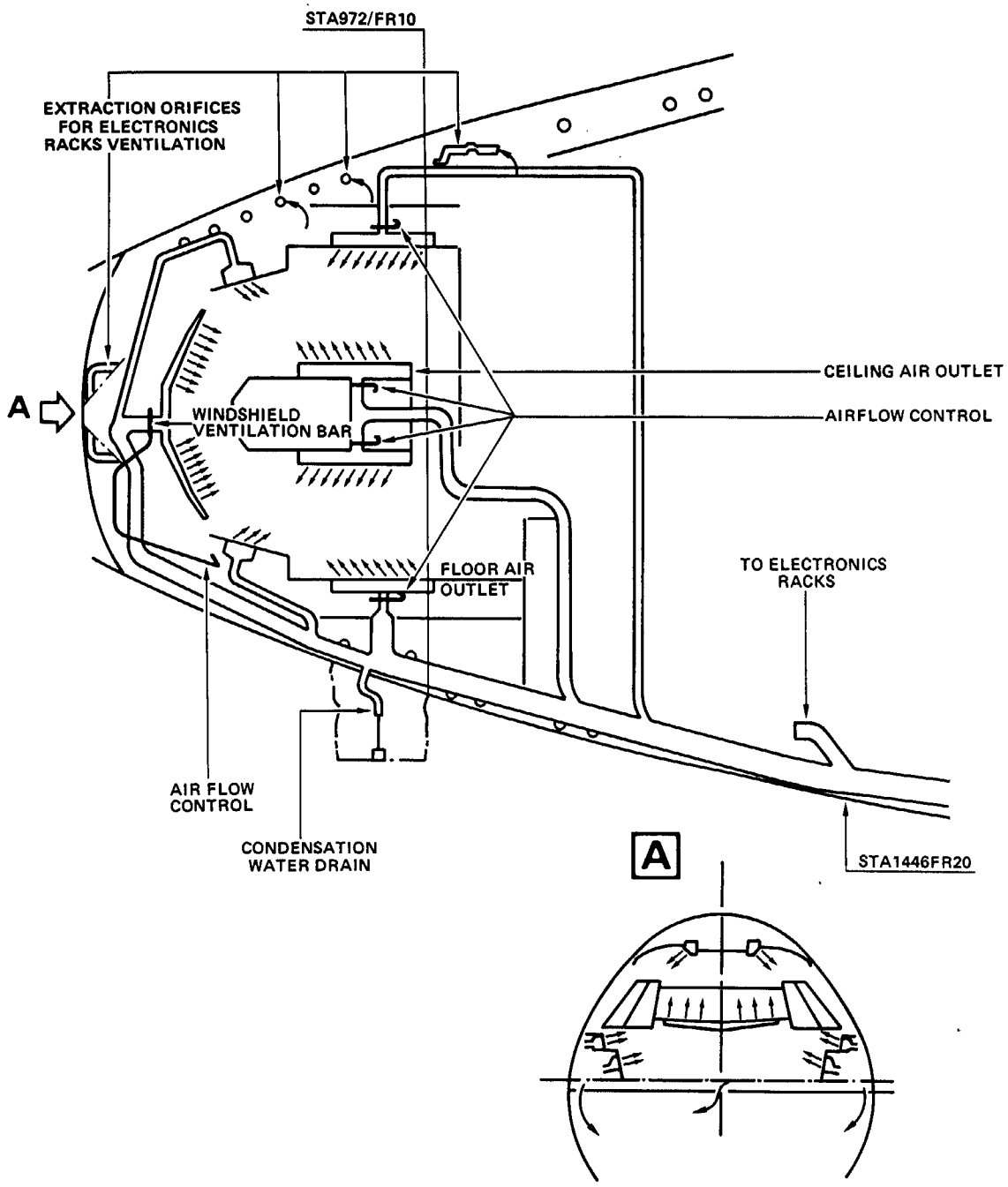
R **ON A/C 101-200,

(Ref. Fig. 006)

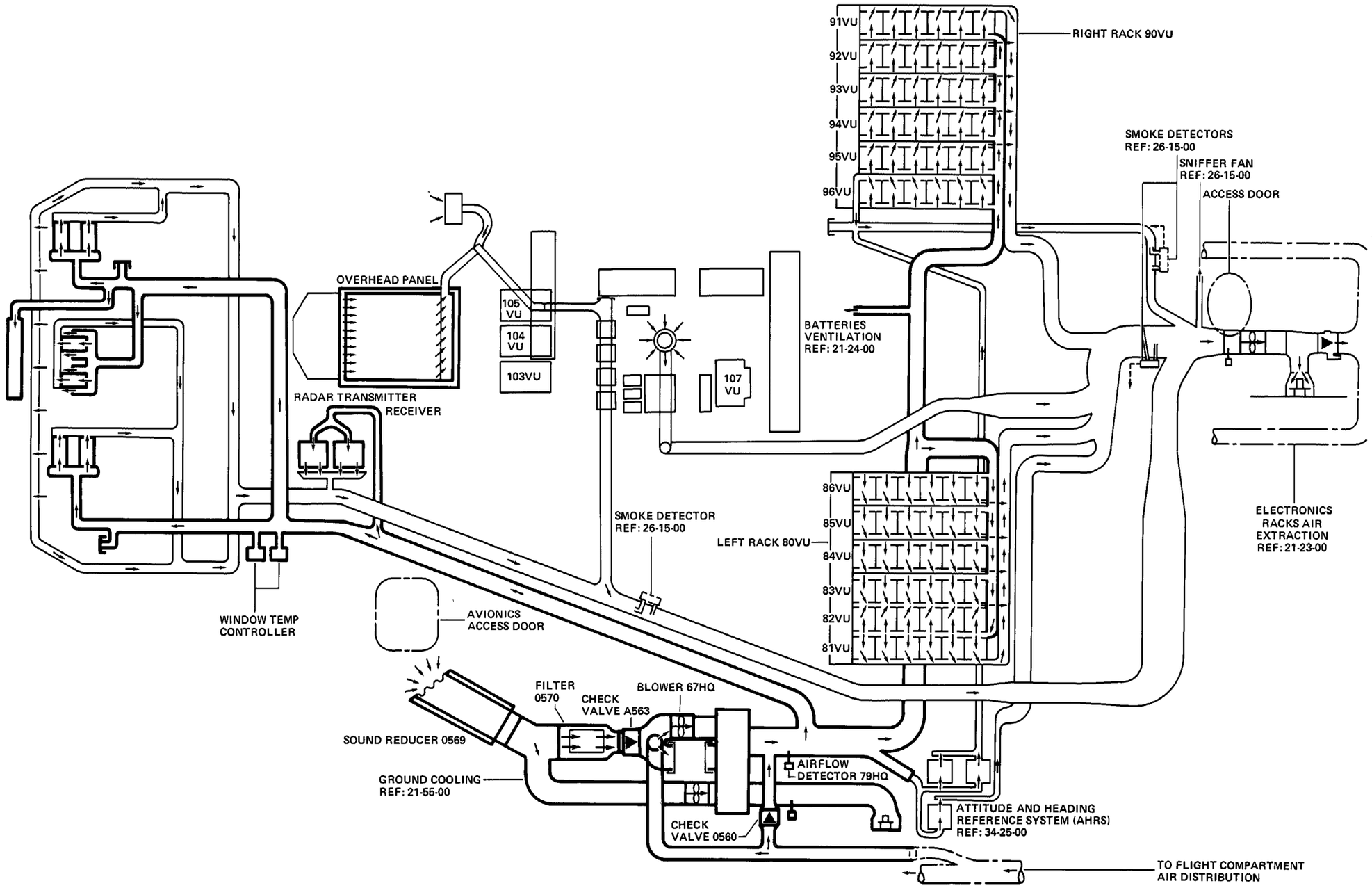
R **ON A/C ALL

(1)General
Ventilation is mainly provided for the left and right electronics racks, the navigation equipment and the main instrument panels in the flight compartment.
Ventilation is achieved by the following cooling principles :
- blowing of air through the equipment via an aperture at the bottom surface with sealing and extraction of the air from above the equipment without sealing.
- blowing of air through the equipment from above without sealing and extraction of the air through air aperture at the bottom surface with sealing
- blowing of air from below the equipment and extraction of the air around the equipment
- blowing of air around the equipment and extraction of ambient air
- blowing of air through the equipment with sealing
- extraction of ambient air.

(2)Blowing system
An air inlet located in the avionics compartment under the flight compartment is provided to supply blower 67HQ via a sound reducer, a

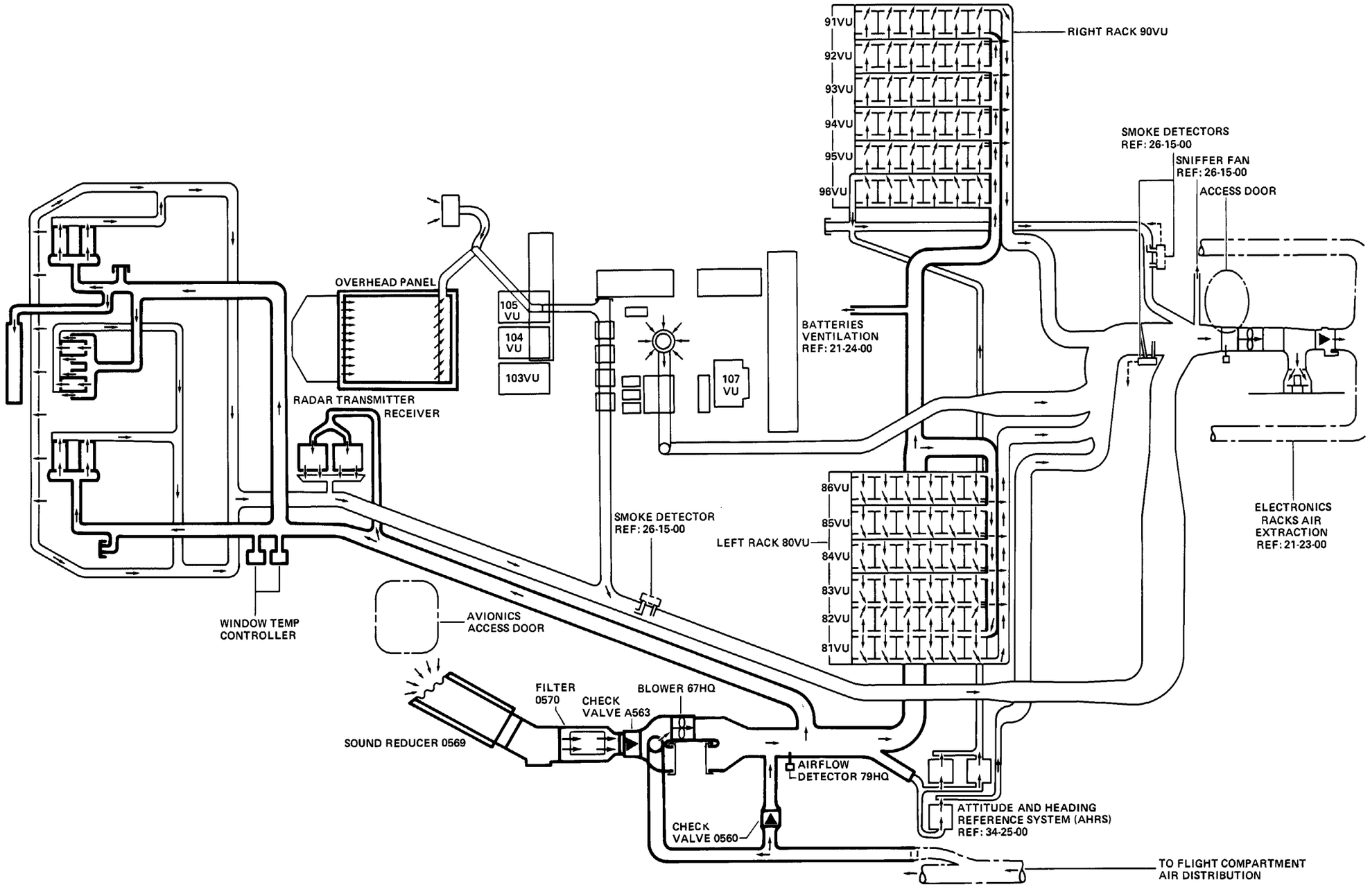


Flight Compartment Air Distribution - Airflow Diagram
Figure 004



BM5 21 21 00 0 ADPO - 15

Electronics Racks Ventilation - Airflow Diagram
Figure 005



BM5 21 21 00 0 ADVO 19

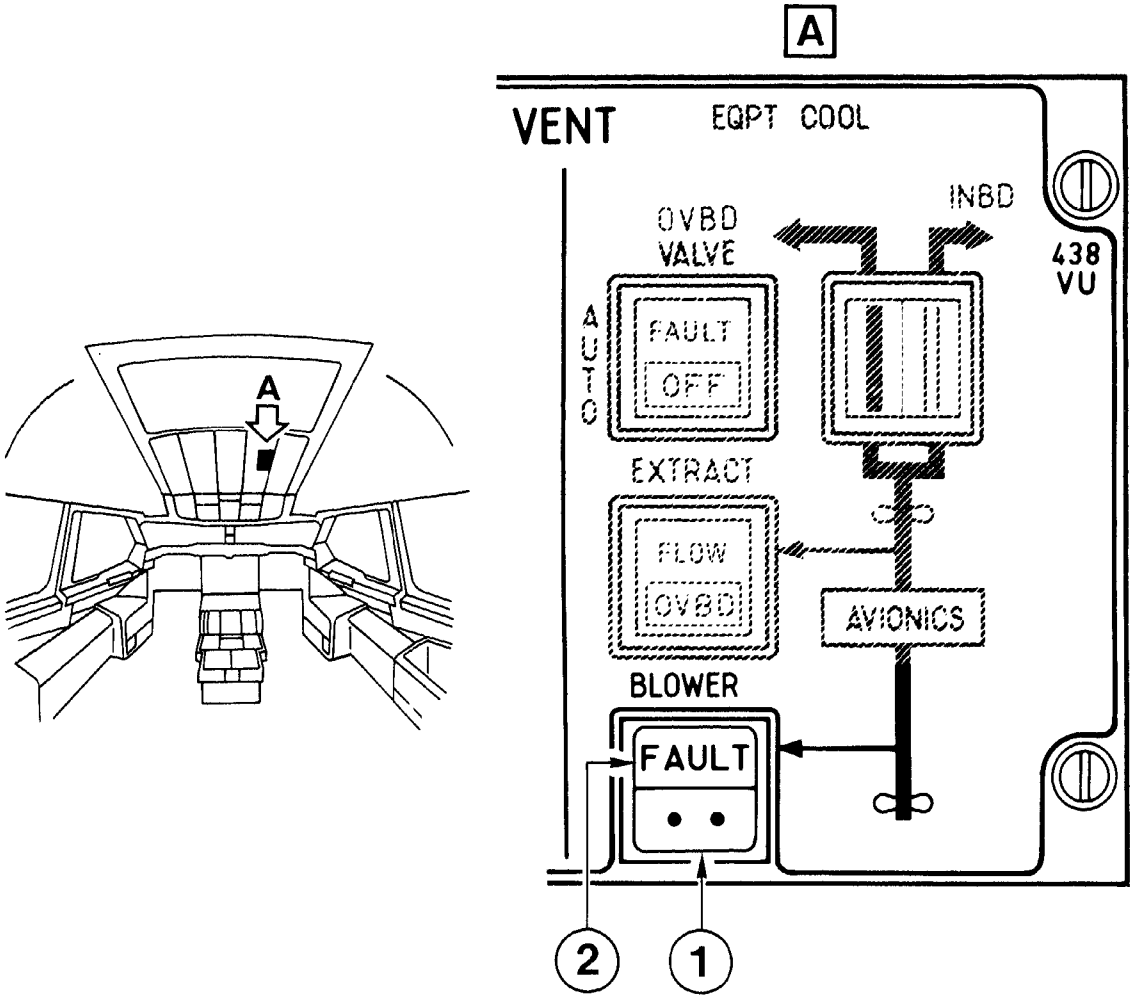
Electronics Racks Ventilation - Airflow Diagram
Figure 006

filter and a check valve.
The airflow is monitored by airflow detector, 79HQ.
In case of failure of the blower, air is tapped from the flight compartment air distribution system to supply the blowing system through a check valve.

C. Controls and Indicating
(Ref. Fig. 007)
(Ref. Fig. 008)

D. Ground Warnings
(Ref. Fig. 009)

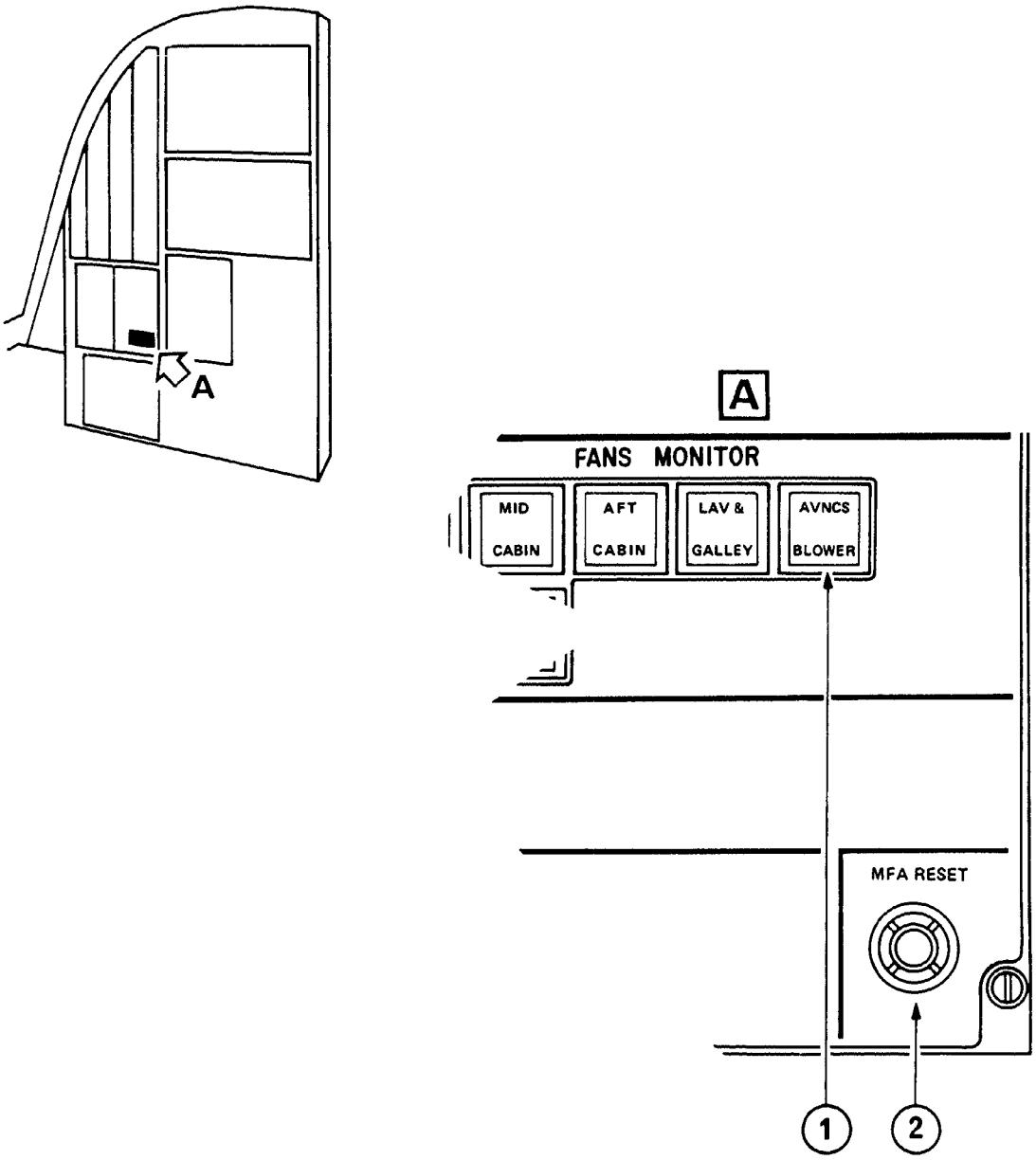
E. Central Warnings
Illumination of the FAULT legend on the BLOWER pushbutton switch is accompanied by :
- Activation of the single chime aural warning.
- Illumination of the MASTER CAUTION lights on CAPT and F/O main instrument panels 3VU and 5VU.
- a message display on the left ECAM display unit (Ref. 31-51-00).



1. BLOWER PUSHBUTTON SWITCH
   - PRESSED (IN) : THE BLOWER OPERATES.
   - RELEASED (OUT) THE BLOWER STOP.
2. FAULT LEGEND ON BLOWER PUSHBUTTON SWITCH
   - LEGEND COMES ON AMBER IN THE EVENT OF FAILURE OF THE ACTIVE BLOWER.

BM5 21 21 00 0 AETO-13

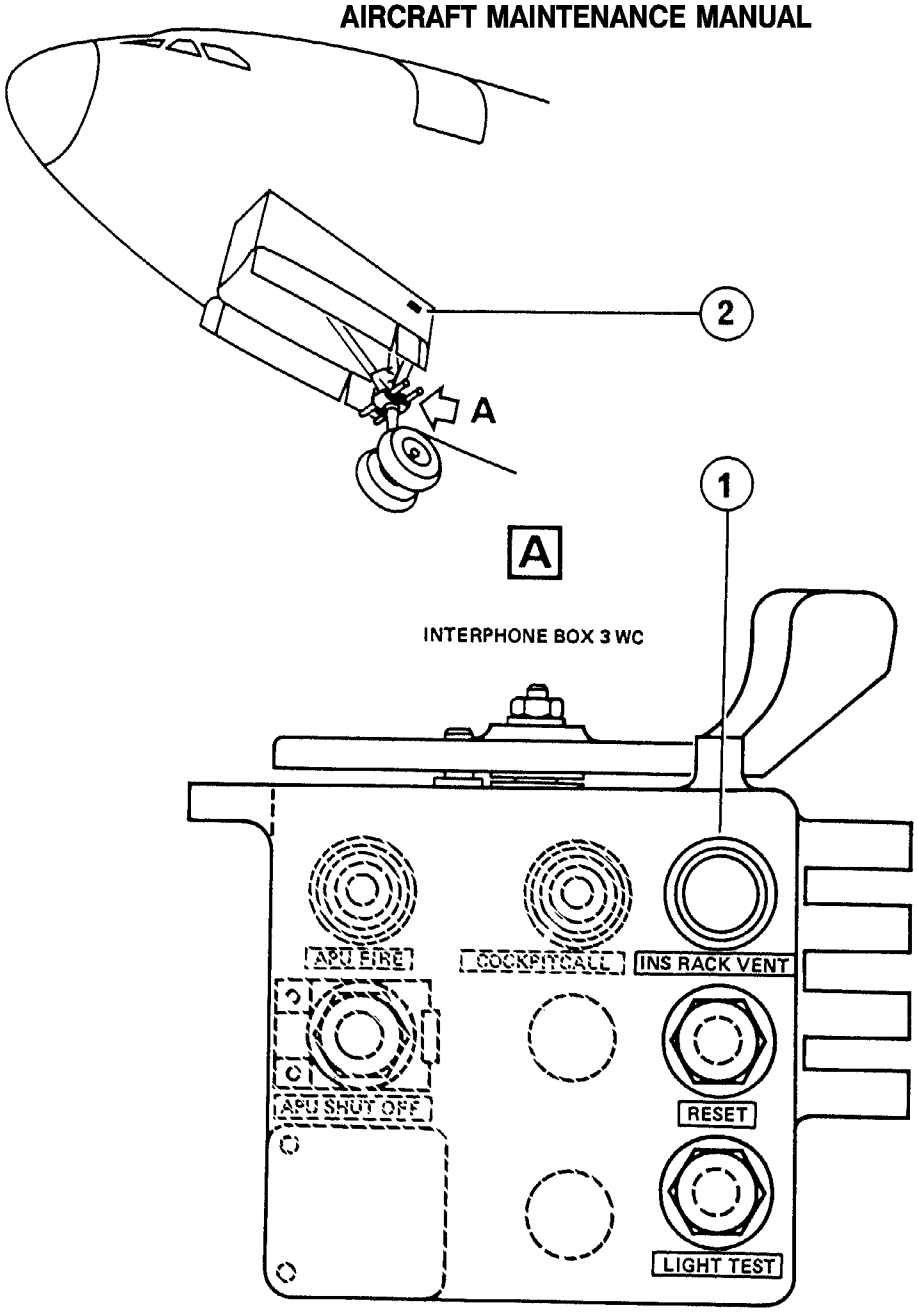
Overhead Panel - VENT Panel 438VU
Figure 007



BM5 21 21 00 0 AGPO-13

- 1. AVNCS BLOWER MEMORIZED FAULT ANNUNCIATOR (MFA)
  - COMES ON, AND MEMORIZES BLOWER FAULTY OPERATION.
- 2. MFA RESET PUSHBUTTON SWITCH
  - ENABLES MFA TO BE UNLATCHED AFTER FAULT HAS DIAPPEARED.

FANS MONITOR Section of Maintenance Panel
Figure 008



BM5 21 21 00 0 AJPO - 15

- 1. INS RACK VENT WARNING LIGHT :
  - COMES ON IN THE EVENT OF INSUFFICIENT AIRFLOW (IN FLIGHT COMPARTMENT, ILLUMINATION OF FLOW LEGEND ON BLOWERS PUSHBUTTON SWITCH).
- 2. MECHANIC CALL HORN 4WC :
  - ACTIVATED IN THE SAME CONDITIONS AS INS RACK VENT WARNING LIGHT.

NOTE : WHEN ENGINES ARE RUNNING, HORN IS INHIBITED.

Interphone Box 3WC
Figure 009

4. Component Description

A. Blower 67HQ (Ref. Fig. 010)
The blower ensures blowing of the air onto the electric and electronic equipment on the ground and in flight. Blower is of the axial type driven by a two-speed 115VAC electric motor; 7800 rpm, low speed, 11600 rpm, high speed.
The blower is equipped with a protection system which causes the blower to stop in the event of overheat.
NOTE : The pushbutton switch and warning light located on the blower body are only used to test the blower on a workshop bench when blower is removed from aircraft.

B. Air Supply Check Valve A563 (Ref. Fig. 011)
The check valve is installed in the blowing system upstream of blower 67HQ.
It is designed to prevent conditioning air from escaping through the air inlet supplying the blowing system. The check valve is of the semi-circular flap type held in closed position by a spring.
An arrow engraved on the check valve body indicates the airflow direction.
Angular positioning on the aircraft duct is ensured by a locating stud which engages in a notch on duct.

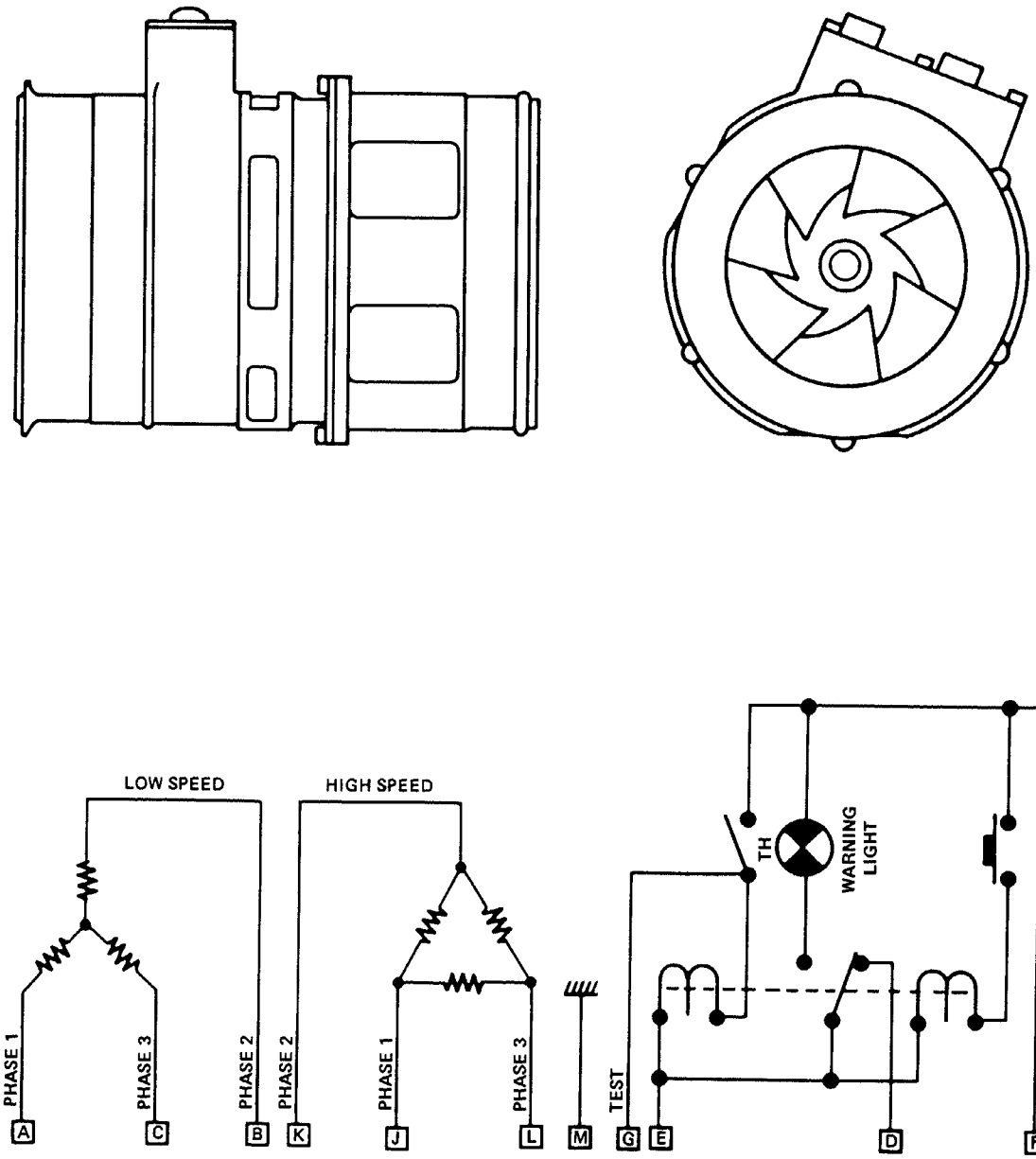
D. Sound Reducer 0569
The sound reducer is installed at the inlet of the blowing system, upstream of the blowers. It prevents noise generated by the blowers from reaching the avionics compartment.

E. Filter 0570
The filter assy consists of a filter cartridge contained in a light alloy housing with access doors. Air is directed through the cartridge which removes dust and nicotine contained in the air supplying the blowing system.

F. Air conditioning Check Valve 0560 (Ref. Fig. 012)
The check valve is installed in the conditioning air supply system downstream of the blower. The valve is :
- closed in normal operating conditions (i.e. blower operating);
- open in abnormal operating conditions (i.e. failure of blower) to ensure blowing of conditioning air onto the main instrument panels and the electronics racks.

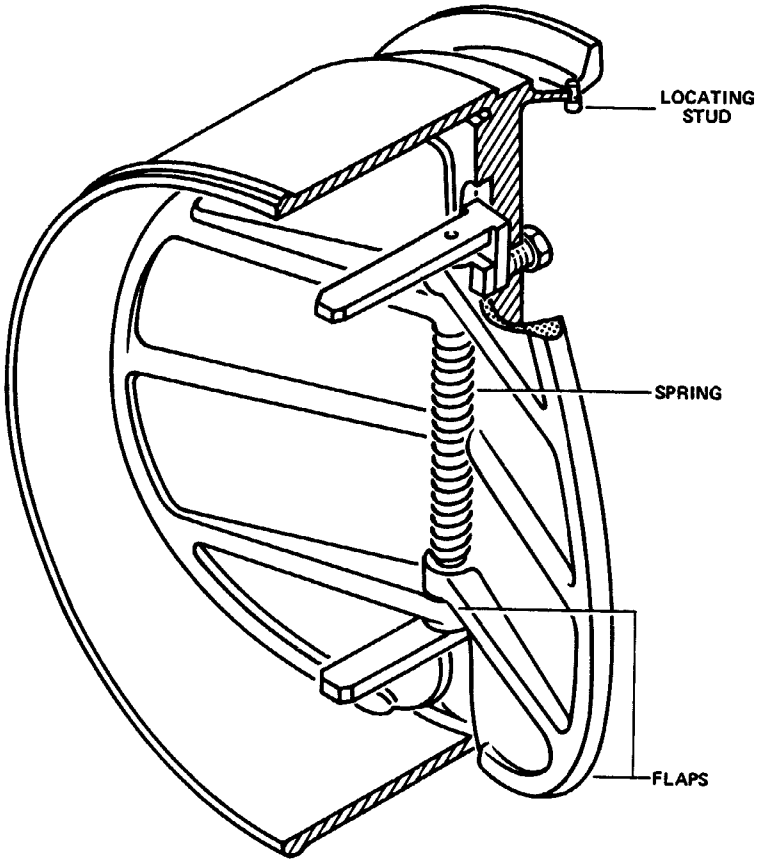
An arrow on the valve body serves to indicate the airflow direction.

G. Airflow Detector 79HQ (Ref. Fig. 013)
The airflow detector is installed in the air blowing system downstream of the blowers.
It serves to trigger warnings when insufficient airflow is detected for a period longer than or equal to three minutes.
Detection is made by a thermistor cooled by the airflow. The detector has two airflow detection levels which depend on the operating speed



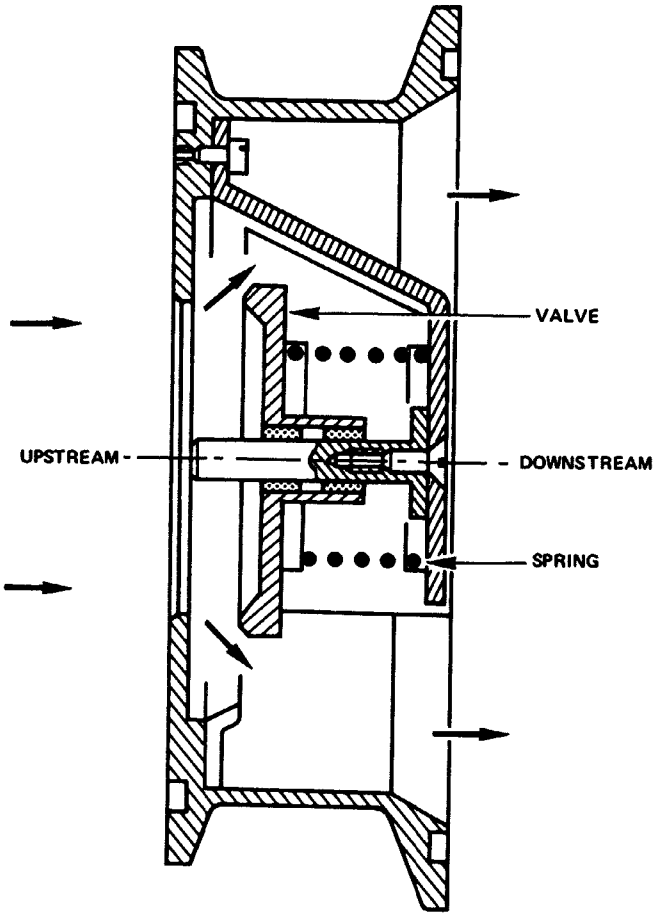
BM5 21 21 00 0 ALPO-16

Blower
Figure 010



BM5 21 21 00 0 ANMO

Air Supply Check Valve
Figure 011



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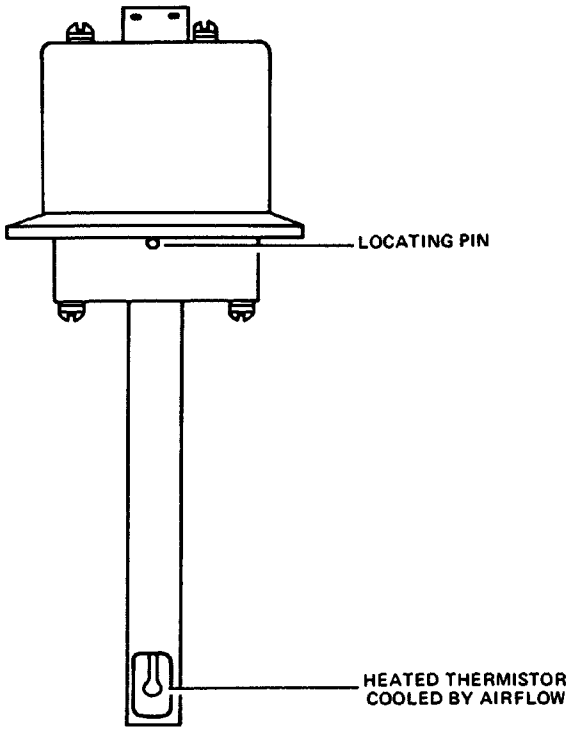
Air Conditioning Check Valve - Schematic
Figure 012



BM5 21 21 00 0 ASMO

Airflow Detector
Figure 013

of the blower selected : high speed or low speed.

5. Operation
(Ref. Fig. 014)

A. Normal Operation Configuration (BLOWER Pushbutton Switch 83HQ Pressed (In))
The blower 67HQ operates at high speed or low speed :
- high speed on the ground with engines and refrigeration unit packs shut down.
- low speed :
  . at start-up of one engine at least
  . at start-up of one refrigeration unit pack at least
  . at the engine starting sequence (to maintain the blower operating at low speed despite the momentary shutdown of the packs).

Systematic switchover from one blower to the other is automatically achieved by pulse generator 84HQ between each flight when both engines are started up.

B. Abnormal Operation Configuration
(1)Failure of blower.
Insufficient airflow in the blowing system sensed by airflow detector 79HQ causes after an approximate time delay of 3 minutes (airflow detector 79HQ) :
- illumination of MASTER CAUTION on CAPT and F/O main instrument panels 3VU and 5VU accompanied by activation of the single chime aural warning
- display of a message on the left ECAM display unit
- activation of the ground warnings.

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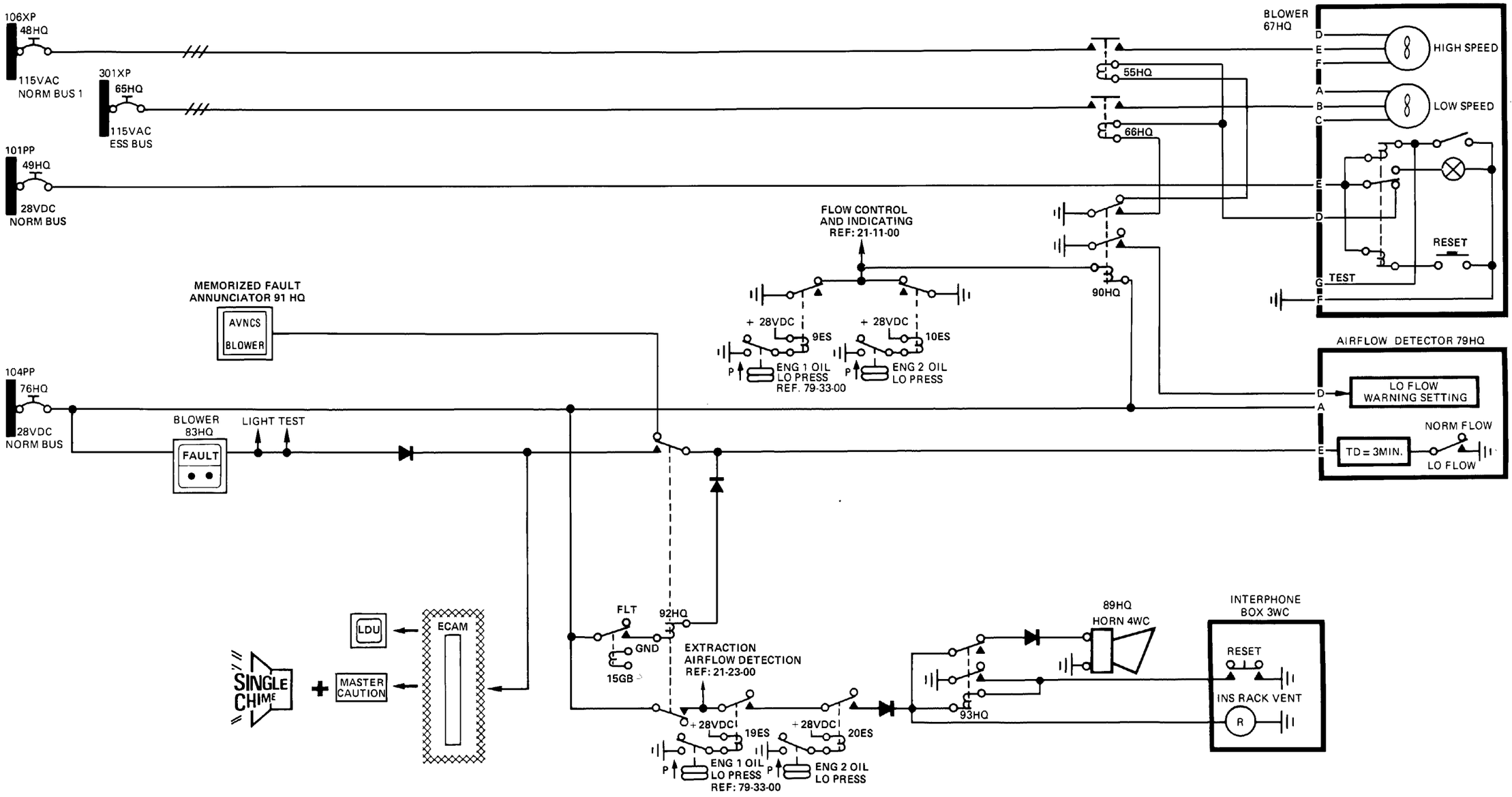


Electronics Racks Air Distribution - Schematic
Figure 014

1. Reason for the Job
To determine the maximum operating time of electric and electronic components located in the avionics compartment, aircraft on ground without air conditioning.

2. Procedure

R **ON A/C ALL

R Post SB 21-2060 For A/C 001-100,

(Ref. Fig. 301)

**ON A/C 001-100,

(Ref. Fig. 302)

R **ON A/C ALL

R Post SB 21-2060 For A/C 001-100,

(Ref. Fig. 303)

**ON A/C 001-100,

(Ref. Fig. 304)

**ON A/C ALL

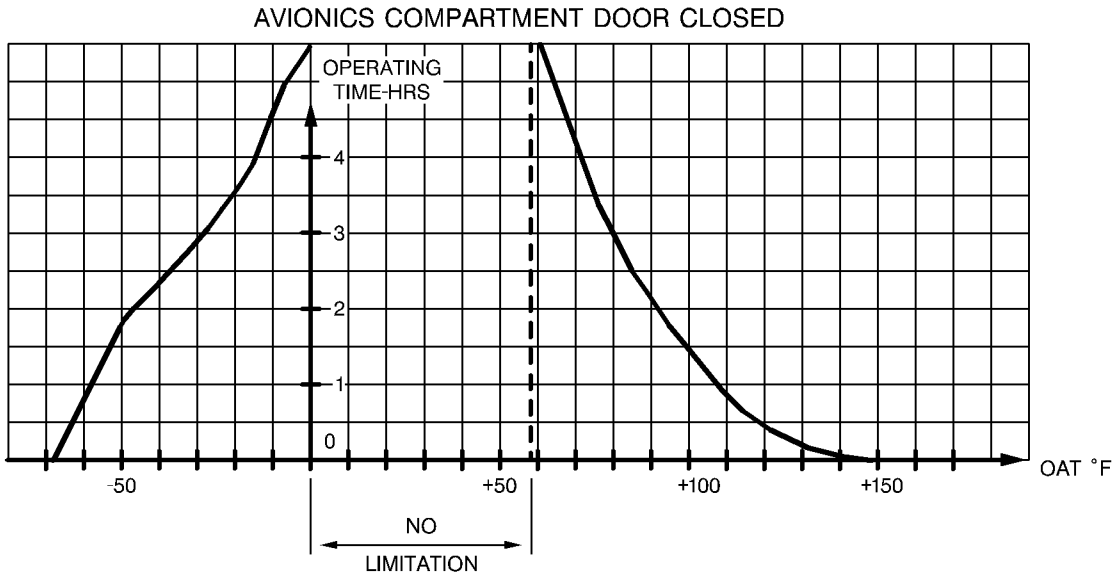
On ground with air conditioning packs shut down, ambient air of the avionics compartment is used for equipment ventilation.
Consequently the permitted operating time may be limited according to :
- Outside Air Temperature (OAT),

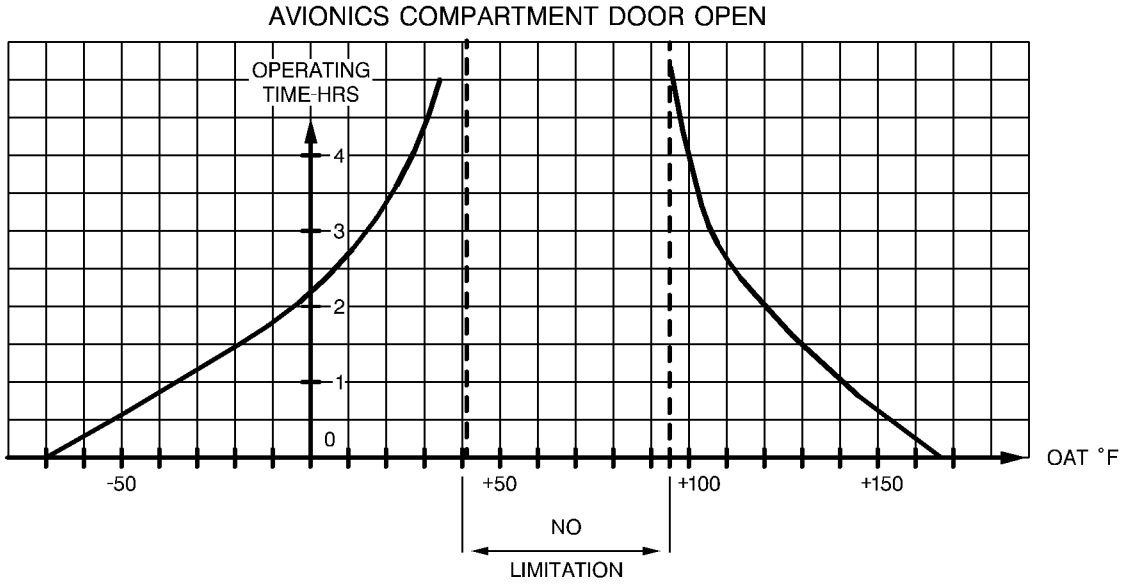
**ON A/C 001-100,

- ground cooling unit operating or not,

**ON A/C ALL

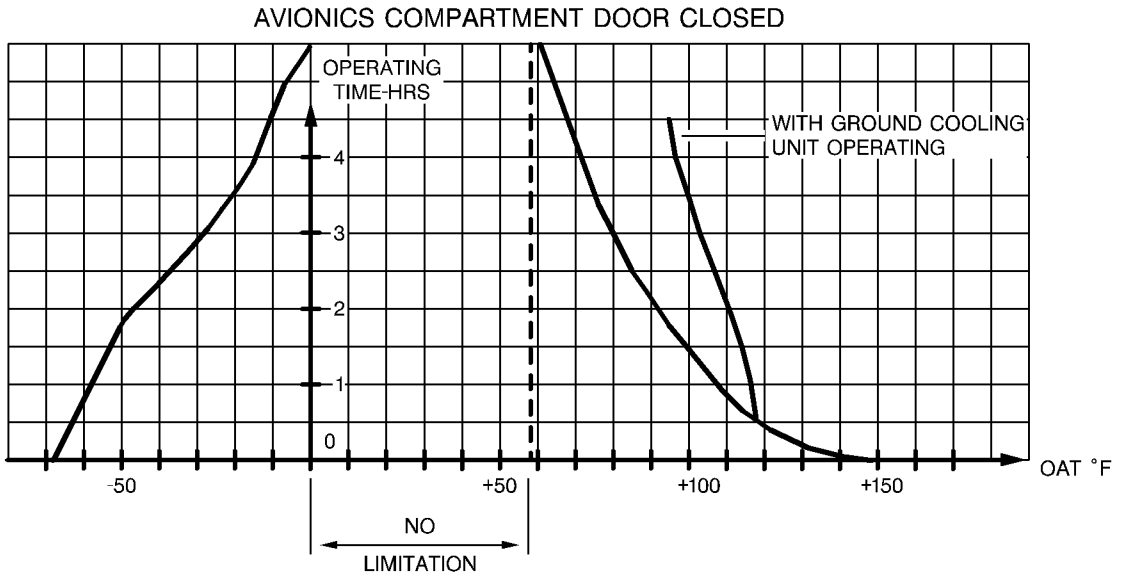
- avionics compartment access door open or closed.
The graphs show the time during which the avionics equipment may remain powered :
- following aircraft arrival, once the air conditioning system is OFF,
- for an aircraft that has been parked with all equipment switched OFF, after powering the aircraft, provided the OAT is above -15°C (+5°F).

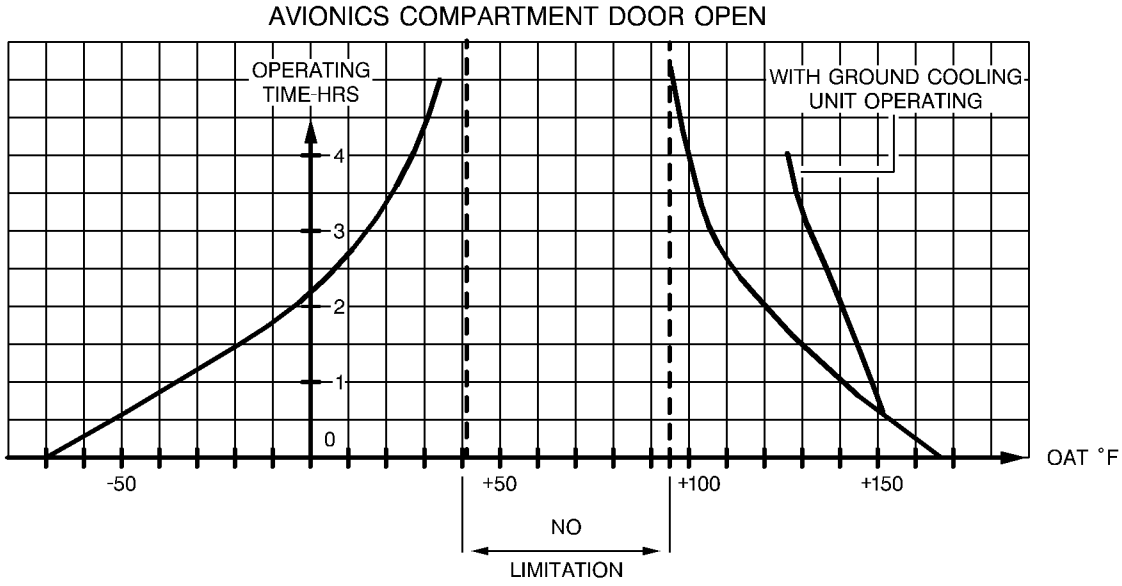




BM5 21 21 00 3 AAM0 00

Equipment Operating Time (Hours/°F)
Figure 301





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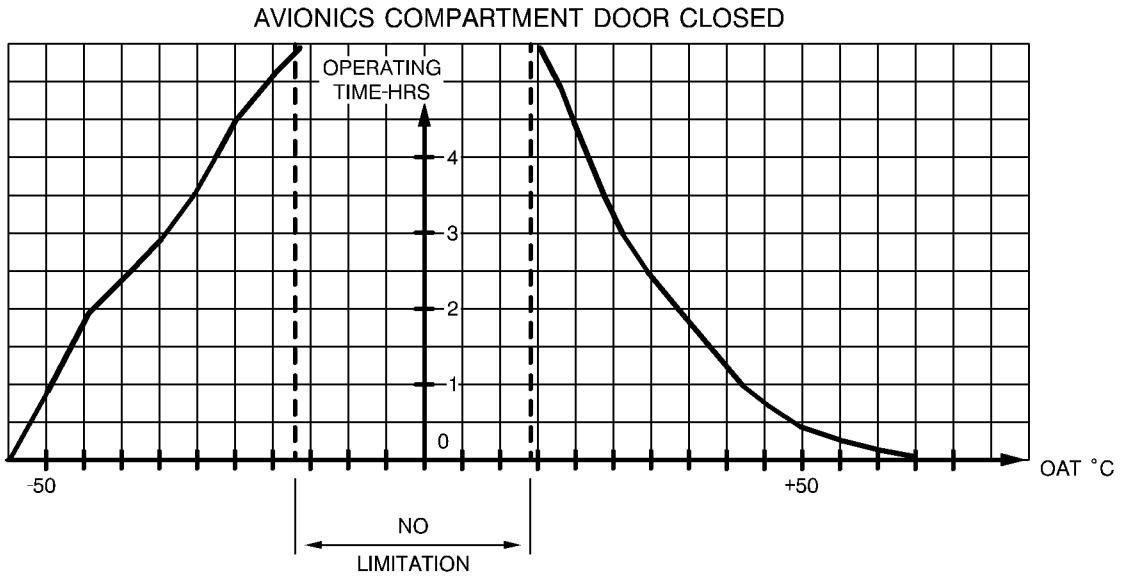
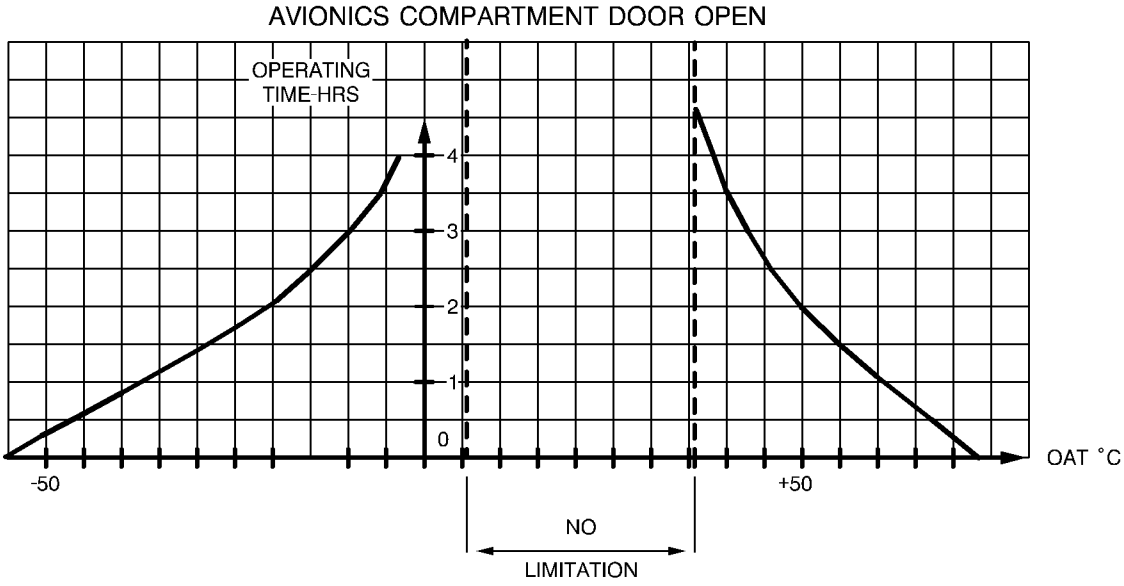
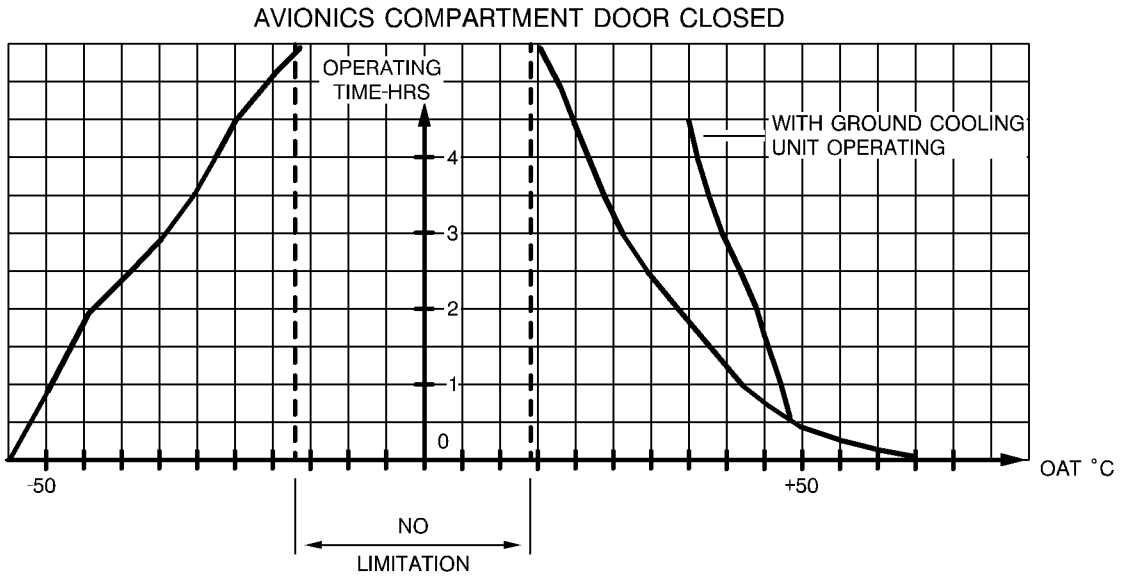
Equipment Operating Time (Hours/°F)
Figure 302

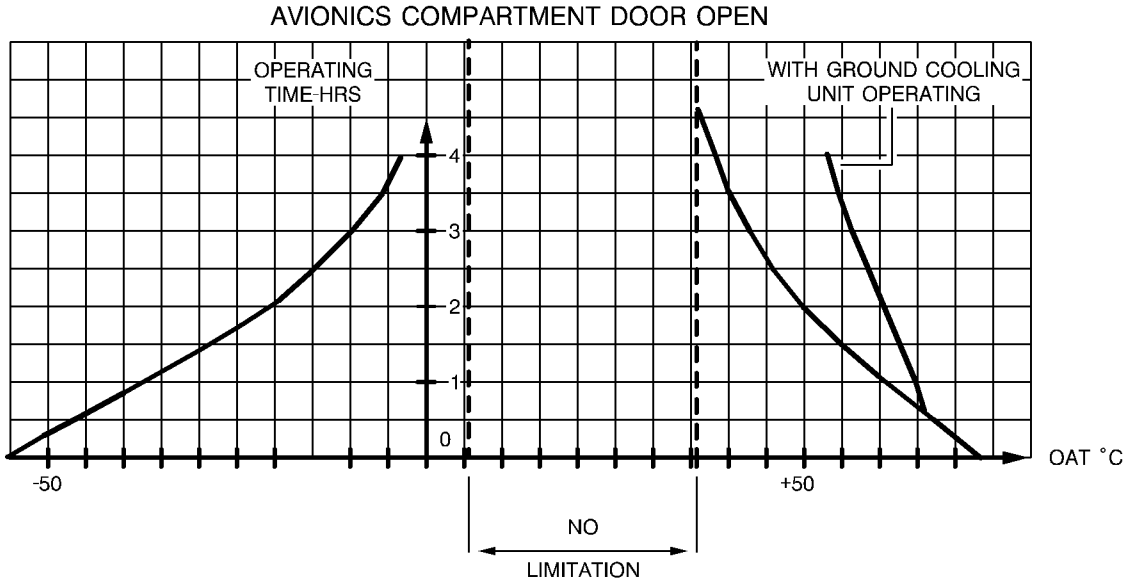




BM5 21 21 00 3 ABM0 00

Equipment Operating Time (Hours/°C)
Figure 303





BM5 21 21 00 3 ADM0 00

Equipment Operating Time (Hours/°C)
Figure 304

NOTE : The avionics compartment access door should be closed with the OAT below 0°C (+32°F).

NOTE : If the OAT is below -15°C (+5°F) it is recommended to pre-heat the avionics compartment to maintain at least -15°C (+5°F), prior to powering any equipment.

R 1. Operational Test of Manual and Automatic Blowers Transfers ("ALTN" and
R "NORM" modes) and "FLOW" warnings.

A. Reason for the Job

R To make certain the air cooling system of electronics racks operates
R correctly.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 79-33-00, P. Block 1	Engine Oil Pressure

C. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that overhead and rear panel circuit breakers are closed, particularly those associated with **VENT** panel 131VU and **LDG GEAR** panel 133VU.

**ON A/C ALL

Post SB 21-2060 For A/C 001-100,

(c)Not applicable

**ON A/C 001-100,

(c)On **VENT** panel 438VU, release **GND COOL/CTL** pushbutton switch (**OFF** legend on).

**ON A/C ALL

(d)On **ENG START** section of panel 429VU

- check that **ENG START** selector switch is in **OFF** position and that **START 1** and **START 2** pushbutton switches are released (out).

(e)On **ECAM** control panel

- press **CLEAR** pushbutton switch until **MASTER WARN** and **MASTER CAUTION** lights go off and **MEMO** page is displayed on L **ECAM** display unit.

(2)Test

NOTE : **INS/IRS RACK VENT** warning light on interphone box and mechanic call horn are not activated if **ENG1 (ENG2)** low oil pressure switch is open or if any electrical connector is disconnected (Ref. 79-33-00, P. Block 1).

ACTION	RESULT
	Blower operates at high speed.
1. On circuit breaker panel 131VU - open **AVIONICS BLOWER SUPPLY/HI SPD** circuit breaker **48HQ**	- blower stops.
	After 3 mn 20 sec approx. . On **VENT** panel **438VU** - **FAULT** legend of **BLOWER** annunciator comes on. . On interphone box (nose landing gear leg) - **INS/IRS RACK VENT** warning light comes on. . In nose landing gear well - mechanic call horn is activated. NOTE 1 : Switch off horn using **RESET** pushbutton switch on interphone box located in nose landing gear well as soon as horn is activated. . On **CAPT** and **F/O** main instrument panels **3VU** and **5VU** - **MASTER CAUTION** lights come on. . Aural warning : single chime. . On L **ECAM** display unit the following message is displayed - **AIR** **VENT BLOWER FAULT.**
2. On circuit breaker panel 131VU - close **AVIONICS BLOWER SUPPLY/HI SPD** circuit breaker **48HQ**	- Blower operates at high speed. . On **VENT** panel **438VU** - **FAULT** legend of **BLOWER** annunciator goes off. . On interphone box (nose landing gear leg) - **INS/IRS RACK VENT** warning light goes off. . In nose landing gear well - horn stops. . On **CAPT** and **F/O** main instrument panels **3VU** and **5VU** - **MASTER CAUTION** lights go off. . On L **ECAM** display unit, message disappears.

ACTION	RESULT
3. On **ENG START** section of panel 429VU - place **ENG START** selector switch in **CRANK** position	- Blower operates at low speed.
4. On circuit breaker panel 131VU - open **AVIONICS BLOWER SUPPLY/LO SPD** circuit breaker **65HQ**	- Blower stops. After 3 mn 20 sec approx. R . On **VENT** panel 438VU - **FAULT** legend of **BLOWER** annunciator comes on. . On interphone box (nose landing gear leg) - **INS/IRS RACK VENT** warning light comes on. . In nose landing gear well - mechanic call horn is activated. . On **CAPT** and **F/O** main instrument panels 3VU and 5VU - **MASTER CAUTION** lights come on. . Aural warning : single chime. . On L **ECAM** display unit, the following message is displayed **AIR** **VENT BLOWER FAULT**
5. On circuit breaker panel 131VU - close **AVIONICS BLOWER SUPPLY/LO SPD** circuit breaker **65HQ**	- Blower operates at low speed. . On **VENT** panel 438VU - **FAULT** legend of **BLOWER** annunciator goes off. . On interphone box (nose landing gear leg) - **INS/IRS RACK VENT** warning light goes off. . In nose landing gear well - horn stops. . On **CAPT** and **F/O** main instrument panels 3VU and 5VU - **MASTER CAUTION** lights go off. . On L **ECAM** display unit, message disappears.
6. On circuit breaker panel 133VU - open **L/G PROX DET/ & RELAYS SYS2/ FLT/GND** circuit breaker R **1GB**	No change.

NOTE 2 : If during the test when **LDG GEAR** circuit breaker **1GB** is open (flight configuration), after 2 minute approx., a flight phase

ACTION	RESULT
change occurs in the FWC and the MASTER CAUTION lights come on, on CAPT and F/O main instrument panels 3VU and 5VU. Therefore, when MASTER CAUTION lights come on, clear then to obtain the normal flight configuration.	
7. On circuit breaker panel 131VU - open AVIONICS BLOWER SUPPLY/LO SPD circuit breaker 65HQ	- Blower stops. After 3 mn 20 sec approx. . On maintenance panel 472VU - AVNCS BLOWER memorized fault annunciator (MFA) comes on.
8. On circuit breaker panel 133VU - close LDG PROX DET/& RELAYS SYS2/ FLT/GND circuit breaker 1GB	. On VENT panel 438VU - FAULT legend of BLOWER annunciator comes on. . On interphone box (nose landing gear leg) - INS/IRS RACK VENT warning light comes on. . In nose landing gear well - mechanic call horn is activated. . On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on. . Aural warning : single chime. . On L ECAM display unit, the following message is displayed AIR VENT BLOWER FAULT.
9. On circuit breaker panel 131VU - close AVIONICS BLOWER SUPPLY/LO SPD circuit breaker 65HQ	- Blower operates at low speed. . On VENT panel 438VU - FAULT legend of BLOWER annunciator goes off. . On interphone box (nose landing gear leg) - INS/IRS RACK VENT warning light goes off. . In nose landing gear well - horn stops. . On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. . On L ECAM display unit, message disappears.

ACTION	RESULT
10.On maintenance panel 472VU - press MFA RESET pushbutton switch	- AVNCS BLOWER memorized fault annunciator (MFA) goes off.
11.On ENG START section of panel 429VU - place ENG START selector switch in OFF position	- Blower operates at high speed.

(3)Close-up
(a)On maintenance panel 472VU, place ANN LT switch in OFF position.
(b)Restore system and aircraft to normal operating condition.
(c)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

R

CAUTION : DE-ENERGIZE THE AIRCRAFT ELECTRICAL NETWORK (PROTECTION OF ELECTRIC AND ELECTRONIC COMPONENTS IN AVIONICS COMPARTMENT).

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.6 m. (8 ft. 6 in.)
R B.	Torque Wrench - 0.8 m.daN (71 lbf.in.)
C.	Circuit Breaker Safety Clips
D.	Blanking Plugs/Caps
E.	O-Ring
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

2. Procedure

**ON A/C 101-200,

(Ref. Fig. 401)

**ON A/C 001-100,

(Ref. Fig. 402)

**ON A/C ALL

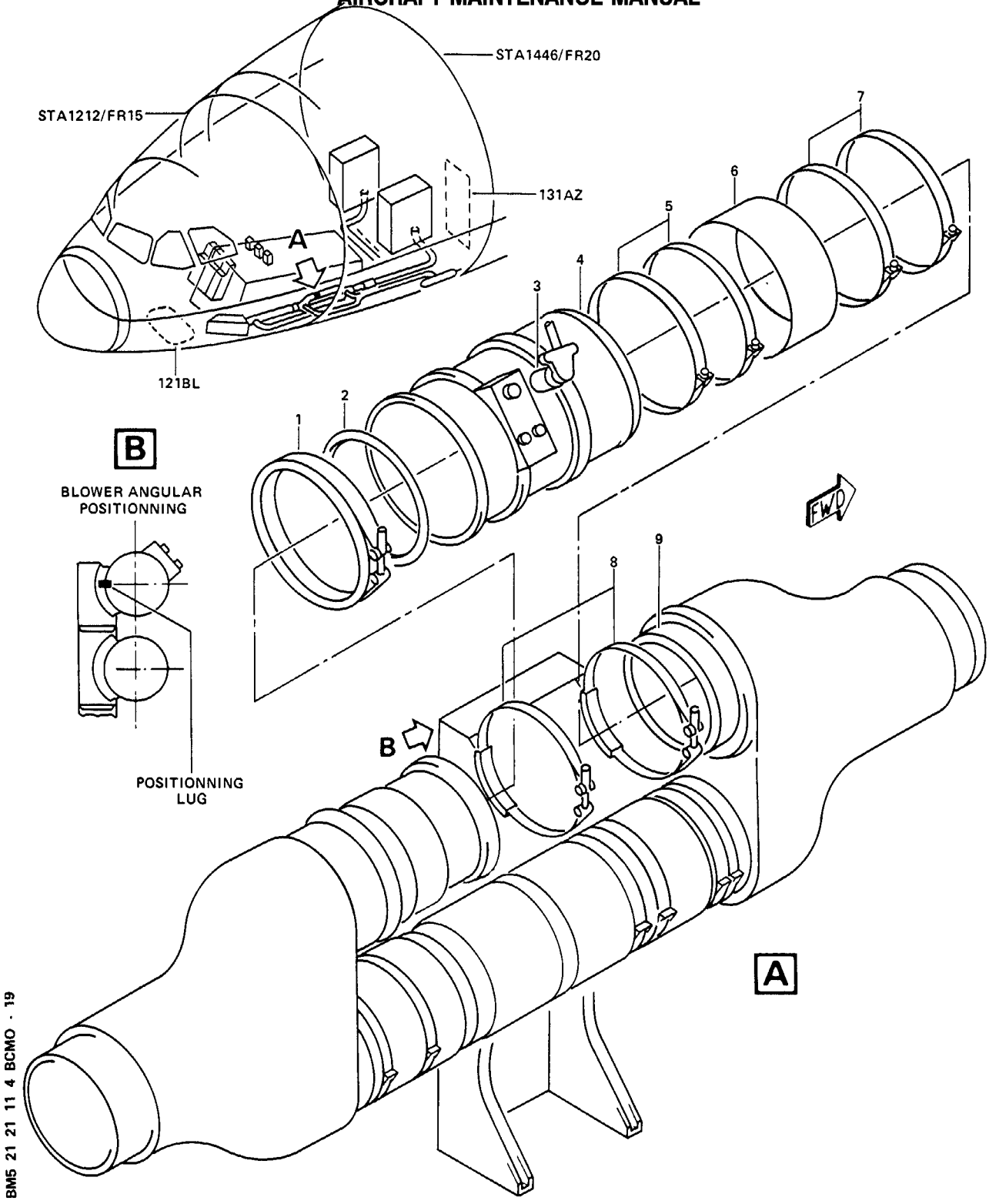
A. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILATION/AVIONICS BLOWER/LO SPD	65HQ	315/D60
131VU	VENTILATION/AVIONICS BLOWER/HI SPD	48HQ	315/D64

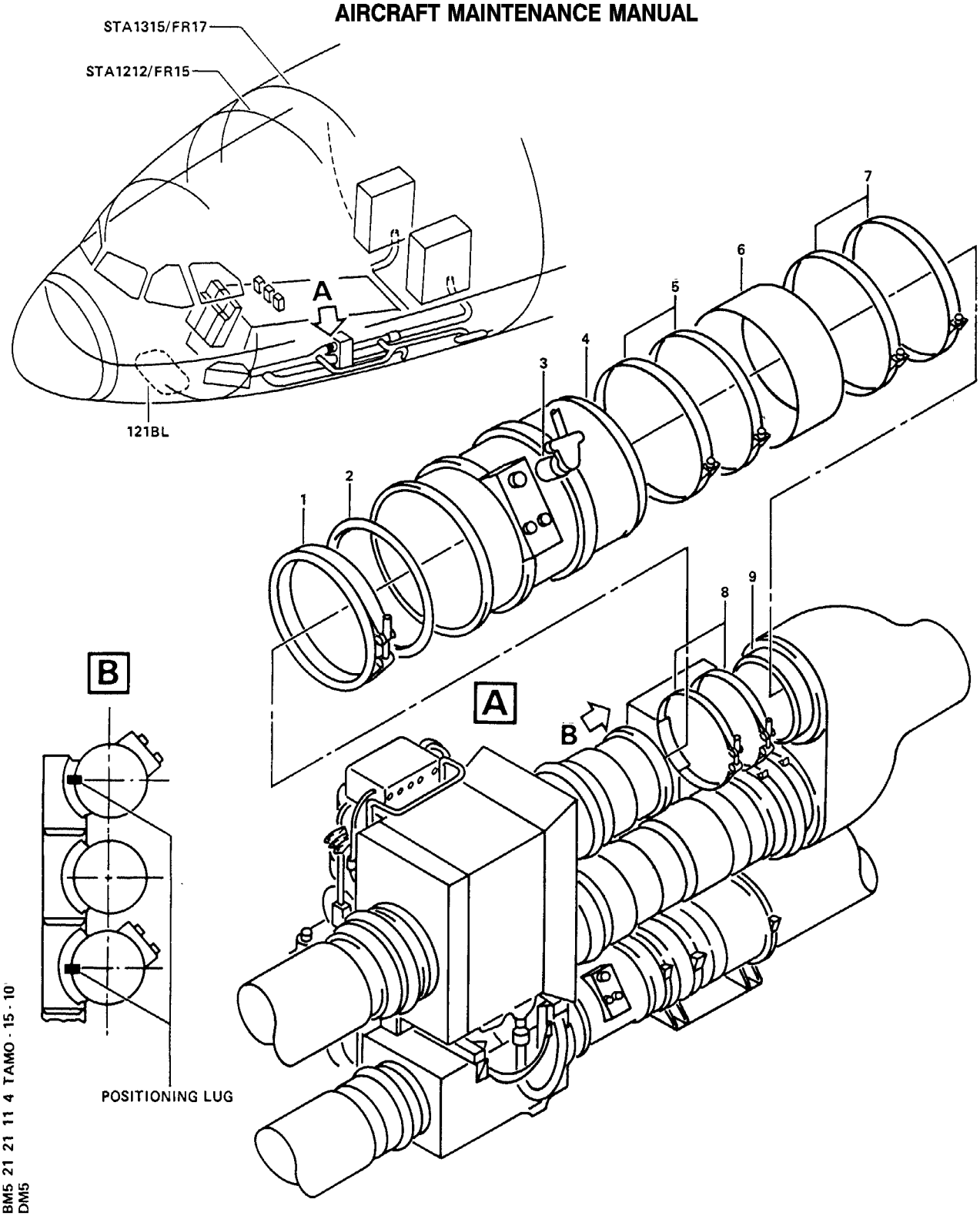
(2)Position access platform
(3)Open access door 121BL.

B. Removal
(1)Disconnect electrical connector 67HQ.A (3).
(2)Remove clamps (5) and (7) and slide flexible sleeve (6) onto duct (9).
(3)Remove clamp (1).
(4)Hold blower (4) in position and open retaining clamp (8). Remove blower (4) and discard O-ring (2).
(5)Cap open duct ends and electrical connector (3).

C. Installation



Blower 67HQ
Figure 401



Blower 67HQ
Figure 402

(1)Remove blanking plugs/caps. Check for correct condition of duct flange, flexible sleeve (6) and electrical connector (3).
(2)Clean and inspect blower adjacent area.
(3)Install O-ring (2) in groove in blower flange.
(4)Install blower (4) on support and in flexible sleeve (6). Rotate blower so that positioning lug on support engages in recess on blower.
(5)Make certain that O-ring (2) remains correctly installed in its groove. Install clamp (1) ; TORQUE to the value given on clamp.
(6)Install flexible sleeve (6) ; install and tighten clamps (5) and (7).
(7)Tighten retaining clamps (8).
(8)Connect electrical connector (3) to blower.
(9)Remove safety clips and tags and close circuit breakers 65HQ and 48HQ.

D. Test
(a)Initial conditions
- circuit breakers closed, particularly those associated with VENTILATION
- correct electrical power supply.

ACTION	RESULT
1. On ENG START section of panel 429VU - check that ENG START selector switch is in OFF position and that START 1 and START 2 pushbutton switches are released (out).	- blower operates at high speed.
2. On ENG START section of panel 429VU - place ENG START selector switch in CRANK position	- blower operates at low speed.
- place ENG START selector switch in OFF position	- blower operates at high speed.

E. Close-Up
(1)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.
(2)Close access door 121BL.
(3)Remove access platform.
(4)Restore system and aircraft to normal operating condition.

AIRFLOW DETECTOR 79HQ - REMOVAL/INSTALLATION

CAUTION : DE-ENERGIZE THE AIRCRAFT ELECTRICAL NETWORK (PROTECTION OF ELECTRIC AND ELECTRONIC COMPONENTS IN AVIONICS COMPARTMENT).

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.6 m (8 ft. 6 in.)
B.	Torque Wrench - 0.6 m.daN (53 lbf. in.)
C.	Circuit Breaker Safety Clips
D.	O-Ring
E.	Blanking Plugs/Caps
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 21-21-00, P. Block 501	Flight Compartment and Electronics Racks Air Distribution

2. Procedure

R **ON A/C 101-200,

(Ref. Fig. 401)

R **ON A/C 001-100,

(Ref. Fig. 402)

R **ON A/C ALL

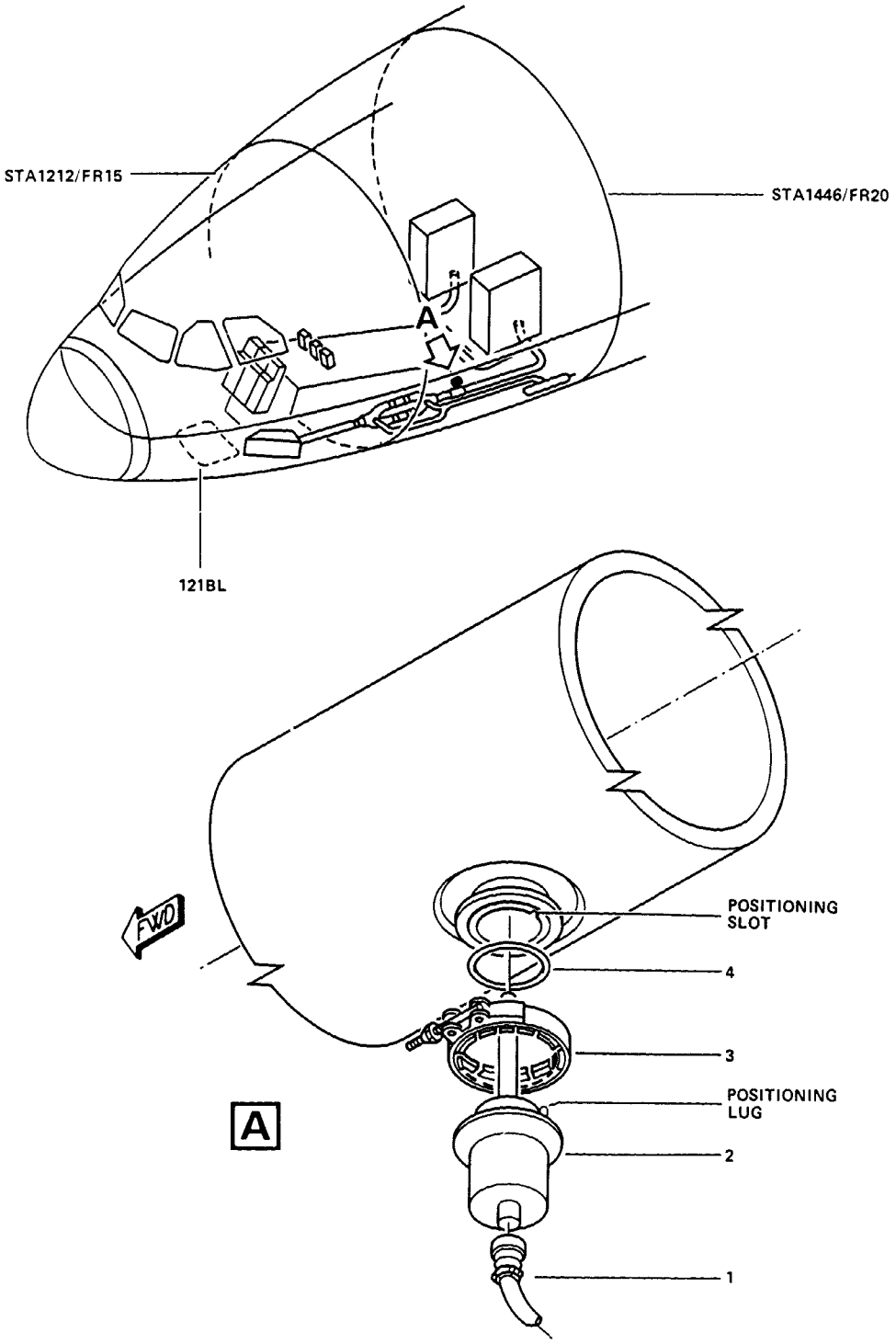
A. Job Set-Up
(1)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILATION/BLOWERS/WARN	76HQ	311/H60

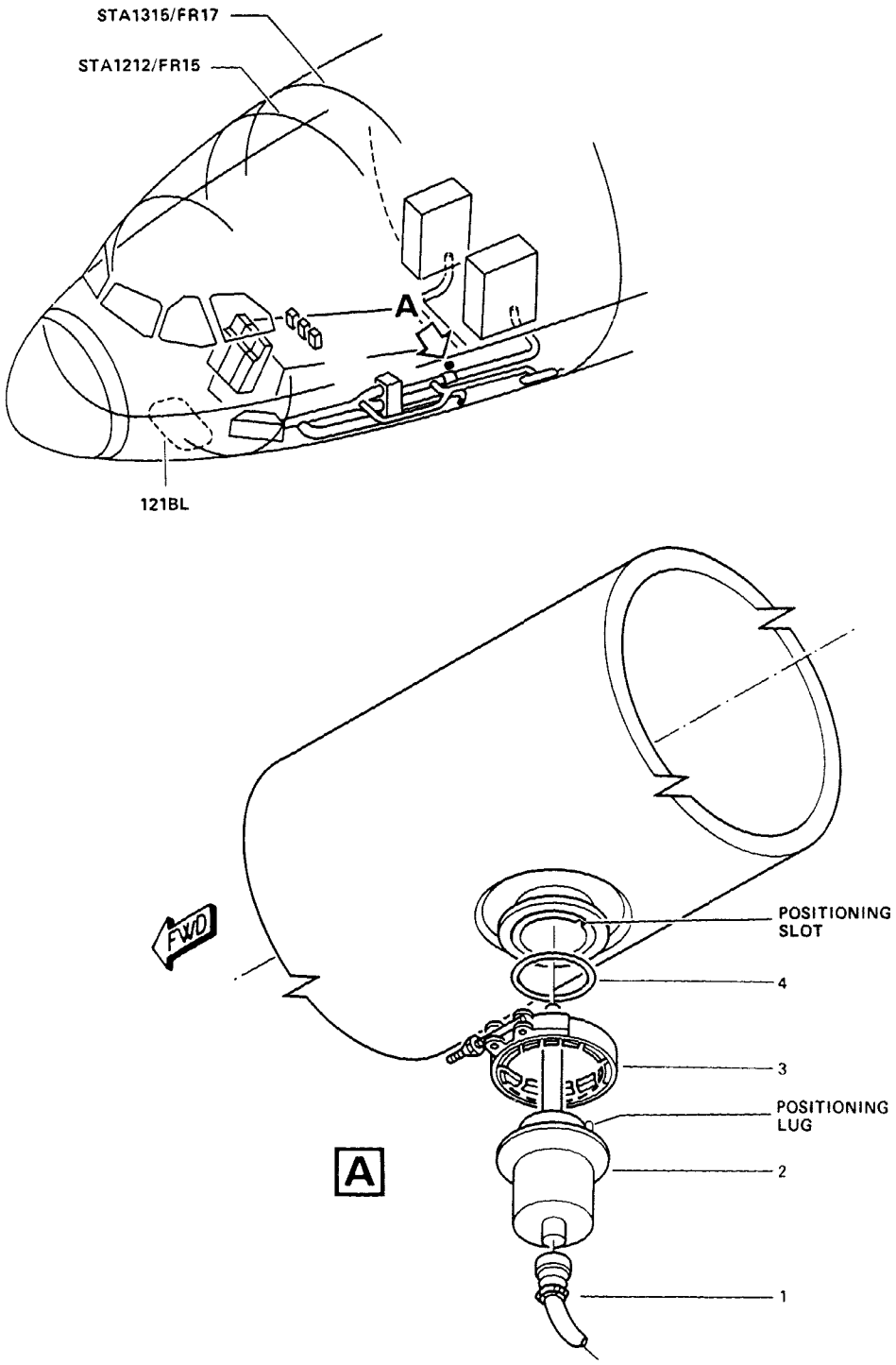
(2)Position access platform.
(3)Open access door 121BL.

B. Removal
(1)Disconnect electrical connector 79HQ-A (1).
(2)Remove clamp (3) and airflow detector (2).
(3)Remove and discard O-ring (4).
(4)Cap open duct and electrical connector (1).

C. Installation
(1)Remove blanking plugs/caps from duct and electrical connector (1). Check for correct condition of duct flange and electrical connector (1).
(2)Clean and inspect flow transmitter adjacent area.



Airflow Detector 79HQ
Figure 401



BM5 21 21 12 4 ABMO 11-06
DM5

Airflow Detector 79HQ
Figure 402

(3)Install O-ring (4) in groove in duct flange.
(4)Install airflow detector (2) paying attention to positioning lug and and clamp (3) ; tighten nut, TORQUE to the value given on clamp.
(5)Connect electrical connector (1) to airflow detector (2).
(6)Remove safety clip and tag and close circuit breaker 76HQ.

D. Test
Initial conditions
- circuit breakers closed particularly those associated with ventilation
- correct electrical power supply

NOTE : INS RACK VENT warning light on interphone box and mechanic call horn are not activated if ENG1 (ENG2) low oil pressure switch is open or if any electrical connector is disconnected (Ref.79-33-00, P. Block 1).

ACTION	RESULT
	Blower operates at high speed.
1. On circuit breaker panel 131VU - open AVIONICS BLOWER SUPPLY/HI SPD circuit breaker 48HQ (location 315/D64)	- blower stops. After 3 minutes approx. . On VENT panel 438VU - FAULT legend of BLOWERS annunciator comes on. . On interphone box (nose landing gear leg) - INS RACK VENT warning light comes on . In nose landing gear well - mechanic call horn is activated. NOTE 1 : Switch off horn using RESET pushbutton switch on interphone box located in nose landing gear well as soon as horn is activated. . On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on. . Aural warning : single chime. . On L ECAM display unit, the following message is displayed AIR - VENT BLOWER FAULT
2. On circuit breaker panel 131VU - close AVIONICS BLOWER SUPPLY/HI SPD circuit breaker 48HQ	- Blower operates at high speed. On VENT panel 438VU - FAULT legend of BLOWER annunciator goes off. On interphone box - INS RACK VENT warning light goes off.

ACTION	RESULT
	In nose landing gear well - horn stops. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. On L ECAM display unit, message disappears.
3. On ENG START section of panel 429VU - place ENG START selector switch in CRANK position.	- Blower operates at low speed.
4. On circuit breaker panel 131VU - open AVIONICS BLOWER SUPPLY LO SPD circuit breaker 65HQ (location 315/D60).	- Blower stops. After 3 minutes approx. . On VENT panel 438VU - FAULT legend of BLOWER annunciator comes on. . On interphone box (nose landing gear leg) - INS RACK VENT warning light comes on. . In nose landing gear well - mechanic call horn is activated. . On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on. . Aural warning : single chime. . On L ECAM display unit, the following message is displayed AIR - VENT BLOWER FAULT
5. On circuit breaker panel 131VU - close AVIONICS BLOWER SUPPLY/LO SPD circuit breaker 65HQ.	- Blower operates at low speed. On VENT panel 438VU - FAULT legend of BLOWER annunciator goes off. On interphone box - INS RACK VENT warning light goes off. In nose landing gear well - horn stops. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. On L ECAM display unit, message disappears.

ACTION	RESULT
6. On ENG START section of panel 429VU - place ENG START selector switch in OFF position.	- Blower operates at high speed.

E. Close-Up
(1)On maintenance panel 472VU, place ANN LT switch in OFF position.
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Close access door 121BL.
(5)Remove access platform.

AIR SUPPLY CHECK VALVE A563 - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Torque Wrench 0.8 m.daN. (71 lbf. in.)
B.	Blanking Plugs/Caps
C.	O-Ring

2. Procedure

R **ON A/C 101-200,

(Ref. Fig. 401)

R **ON A/C 001-100,

(Ref. Fig. 402)

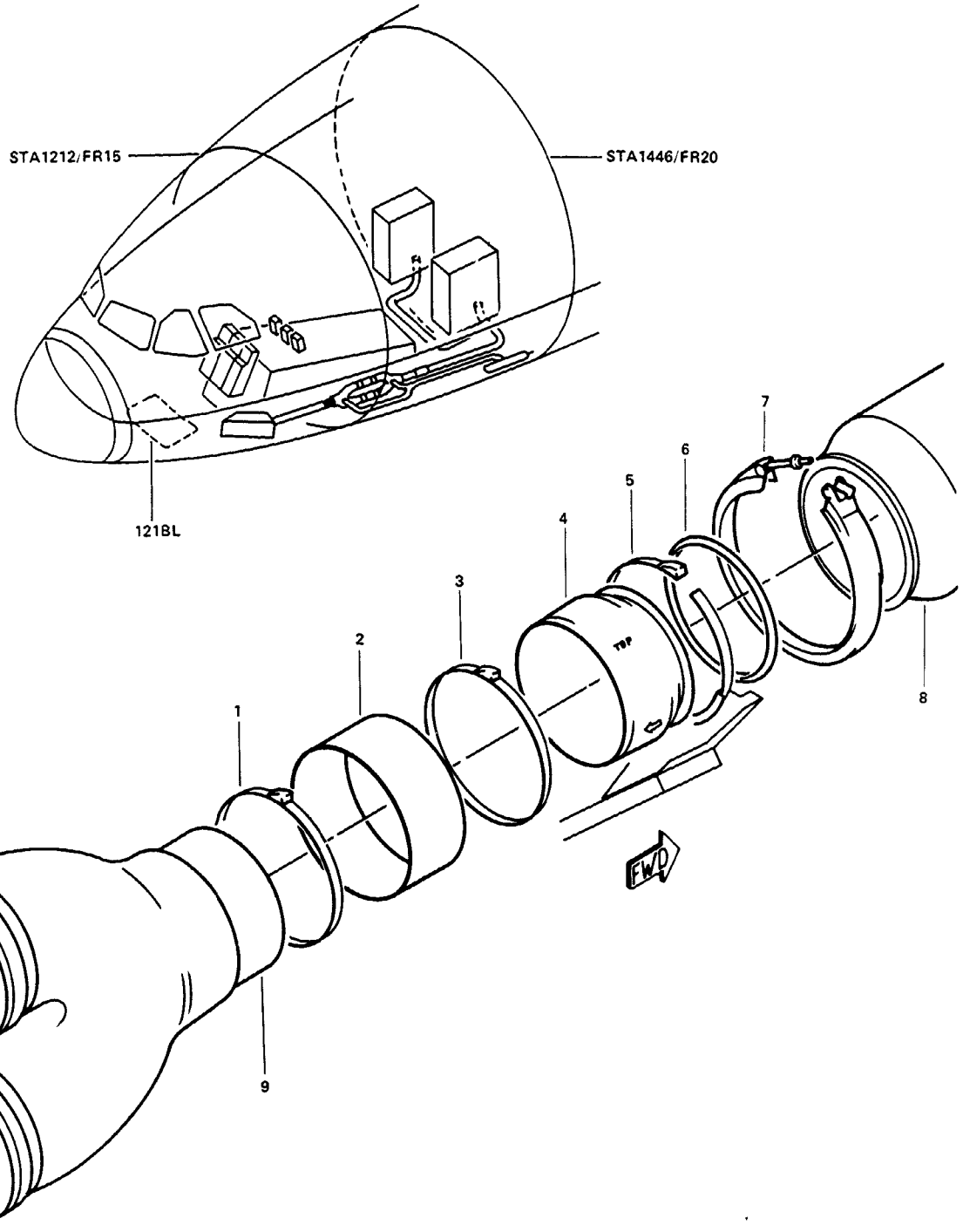
R **ON A/C ALL

A. Job Set-Up
(1)Open access door 121BL.

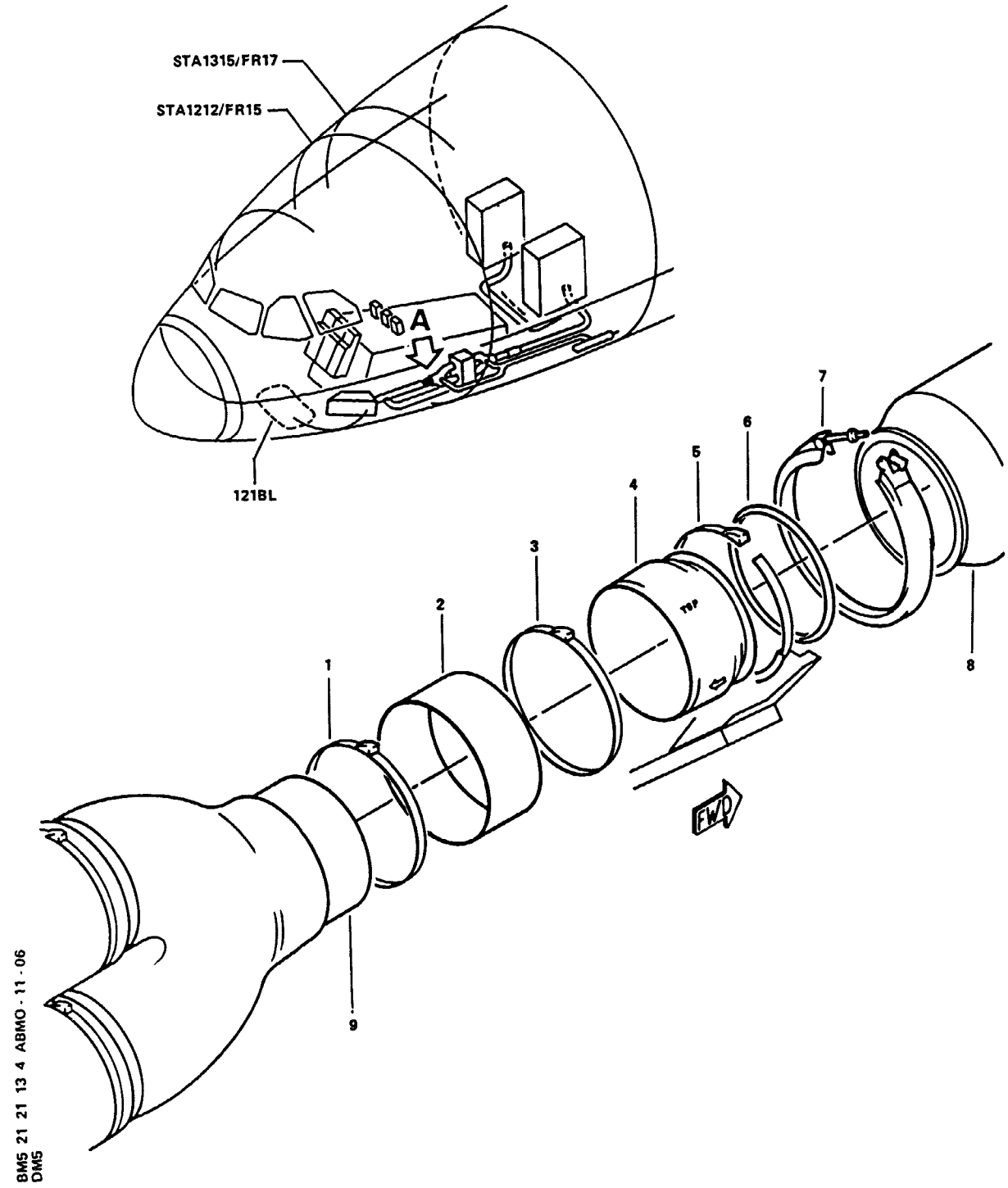
B. Removal
(1)Remove clamps (1) and (3) and slide flexible sleeve (2) onto duct (9) to free check valve (4).
(2)Remove clamp (7).
(3)Hold check valve (4), open attachment clamp (5). Remove check valve (4) and remove and discard O-ring (6).
(4)Cap open duct ends.

C. Installation
(1)Remove blanking plugs/caps and check for correct condition of duct flange and flexible sleeve (2).
(2)Clean and inspect check valve interface and/or adjacent area.
(3)Install new O-ring (6) in its groove on filter flange (8).
(4)Install check valve (4) in flexible sleeve (2) and on filter flange (8), with arrow indicating air flow direction pointing rearwards.
Install clamp (5). Do not tighten at this stage.
NOTE : Check valve angular positioning is provided by means of a location stud (TOP marking located at upper part).
(5)Make certain that O-ring is correctly installed in its groove.
(6)Install and tighten clamp (7). TORQUE to the value given on clamp.
(7)Install flexible sleeve (2); install and tighten clamps (1) and (3).
(8)Tighten attachment clamp (5).

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscel-



Air Supply Check Valve A563
Figure 401



Air Supply Check Valve A563
Figure 402

laneous items of equipment.
(2)Close access door 121BL.

AIR SUPPLY CHECK VALVE A563 - INSPECTION/CHECK

1. Reason for the Job
   Check for condition of check valve.

2. Equipment and Materials

ITEM	DESIGNATION
A. Material No. 11-003	Cleaning Agents (Ref. 20-31-00)
Referenced Procedure - 21-21-13, P. Block 401	Air Supply Check Valve

3. Procedure

A. Job Set-Up
   (1)Remove check valve (Ref. 21-21-13, P. Block 401).
   (2)Clean check valve with Material No. 11-003.

B. Check
   (1)Check condition of check valve, especially semicircular flaps and their seating, hinge pin and tension spring (check for absence of cracks, dents or corrosion).
   (2)Hold check valve so that axis of flap pin is vertical ; manually operate flaps and check that they move freely throughout travel range and seat correctly.

C. Close-Up
   (1)Install check valve (Ref. 21-21-13, P. Block 401).

AIR CONDITIONING CHECK VALVE 0560 - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Torque Wrench 0.6 m.daN. (53 lbf. in.)
B.	Blanking Plugs/Caps
C.	O-Ring

2. Procedure

R **ON A/C 101-200,

(Ref. Fig. 401)

R **ON A/C 001-100,

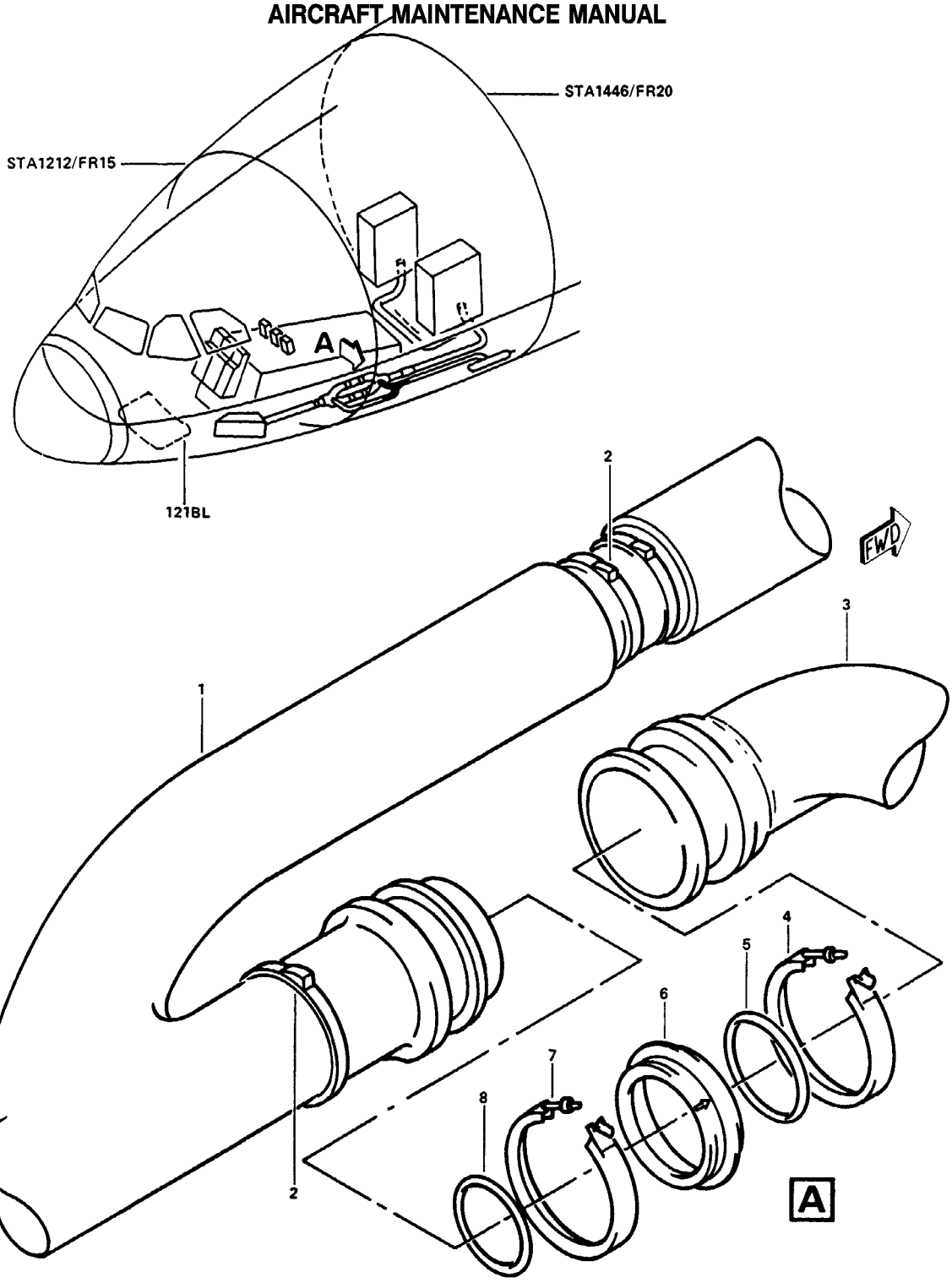
(Ref. Fig. 402)

R **ON A/C ALL

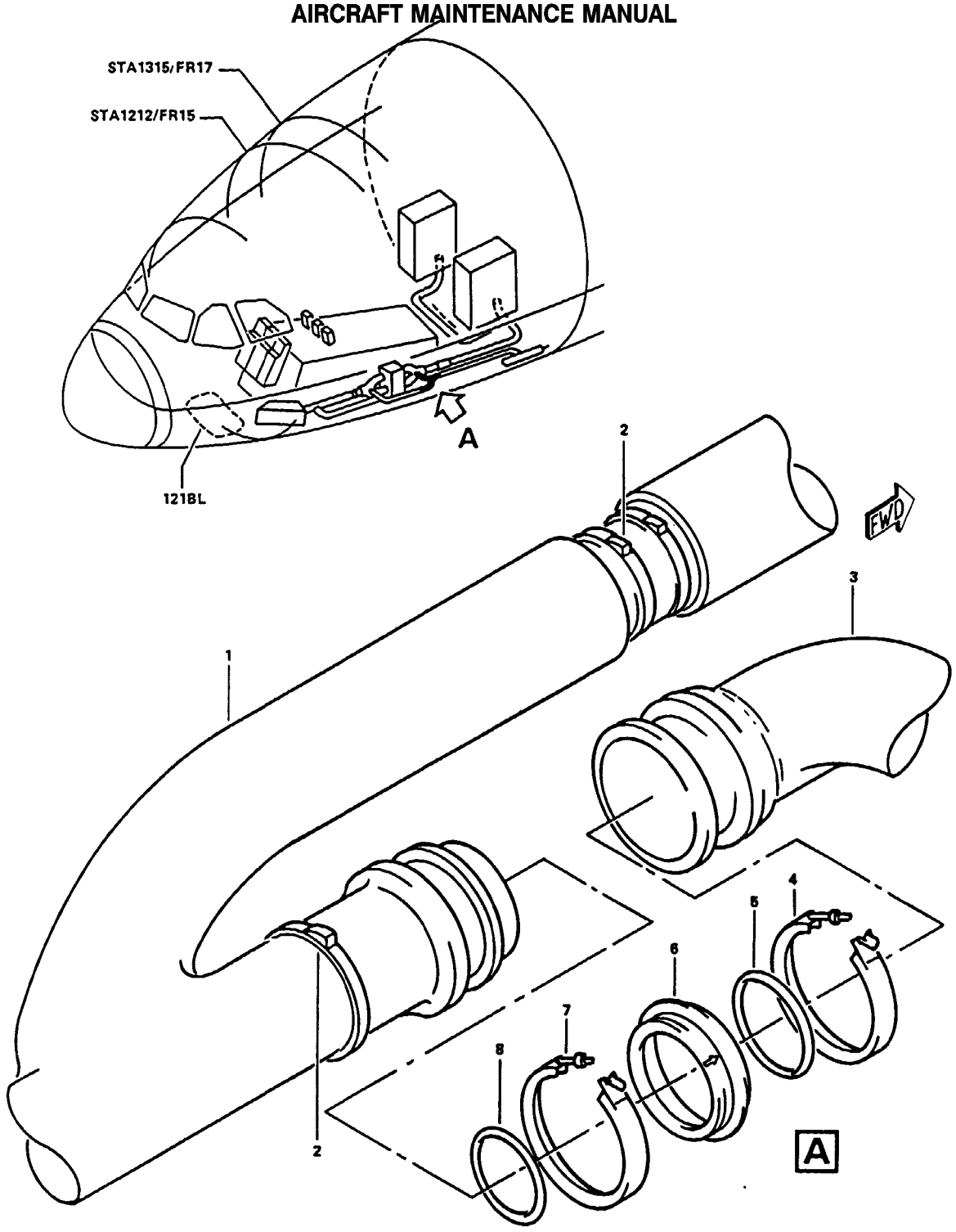
A. Job Set-Up
(1)Open access door 121BL.

B. Removal
(1)Remove clamps (4) and (7).
(2)Loosen clamps (2) and slightly push duct (1) rearwards to ease removal of check valve (6).
(3)Remove check valve (6).
(4)Remove and discard O-rings (5) and (8).
(5)Cap open ends of ducts (1) and (3).

C. Installation
(1)Clean and inspect check valve interface and/or adjacent area.
(2)Remove blanking caps and check for correct condition of flanges of ducts (1) and (3).
(3)Install new O-ring (8) in its groove on duct (1) flange.
(4)Install new O-ring (5) in its groove on check valve (6) flange.
(5)Install check valve (6) between ducts (1) and (3), with arrow indicating air flow direction pointing forwards and valve angular positioning studs in spacer of duct (3).
(6)Make certain that O-ring (5) and (8) are correctly installed in their grooves.
(7)Install duct (1) and push forward so that it contacts check valve flange.
(8)Install and tighten clamps (4) and (7). TORQUE to the value given on clamps.
Tighten clamps (2).



Air Conditioning Check Valve 0560
Figure 401



Air Conditioning Check Valve 0560
Figure 402

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 121BL.

AIR CONDITIONING CHECK VALVE - INSPECTION/CHECK

1. Reason for the Job

A. Check for Correct Condition of Check Valve

2. Equipment and Materials

ITEM	DESIGNATION
A. Material No. 11-004	Cleaning Agents (Ref. 20-31-00)
Referenced Procedure - 21-21-14, P. Block 401	Air Conditioning Check Valve

3. Procedure

A. Job Set-Up
(1)Remove check valve (Ref. 21-21-14, P. Block 401).
(2)Clean check valve with Material No. 11-004A.

B. Check
Check that valve moves freely and returns to closed position (spring-loaded).

C. Close-Up
(1)Install check valve (Ref. 21-21-14, P. Block 401).

SOUND REDUCER 0569 - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs/Caps

2. Procedure

R **ON A/C 101-200,

(Ref. Fig. 401)

R **ON A/C 001-100,

(Ref. Fig. 402)

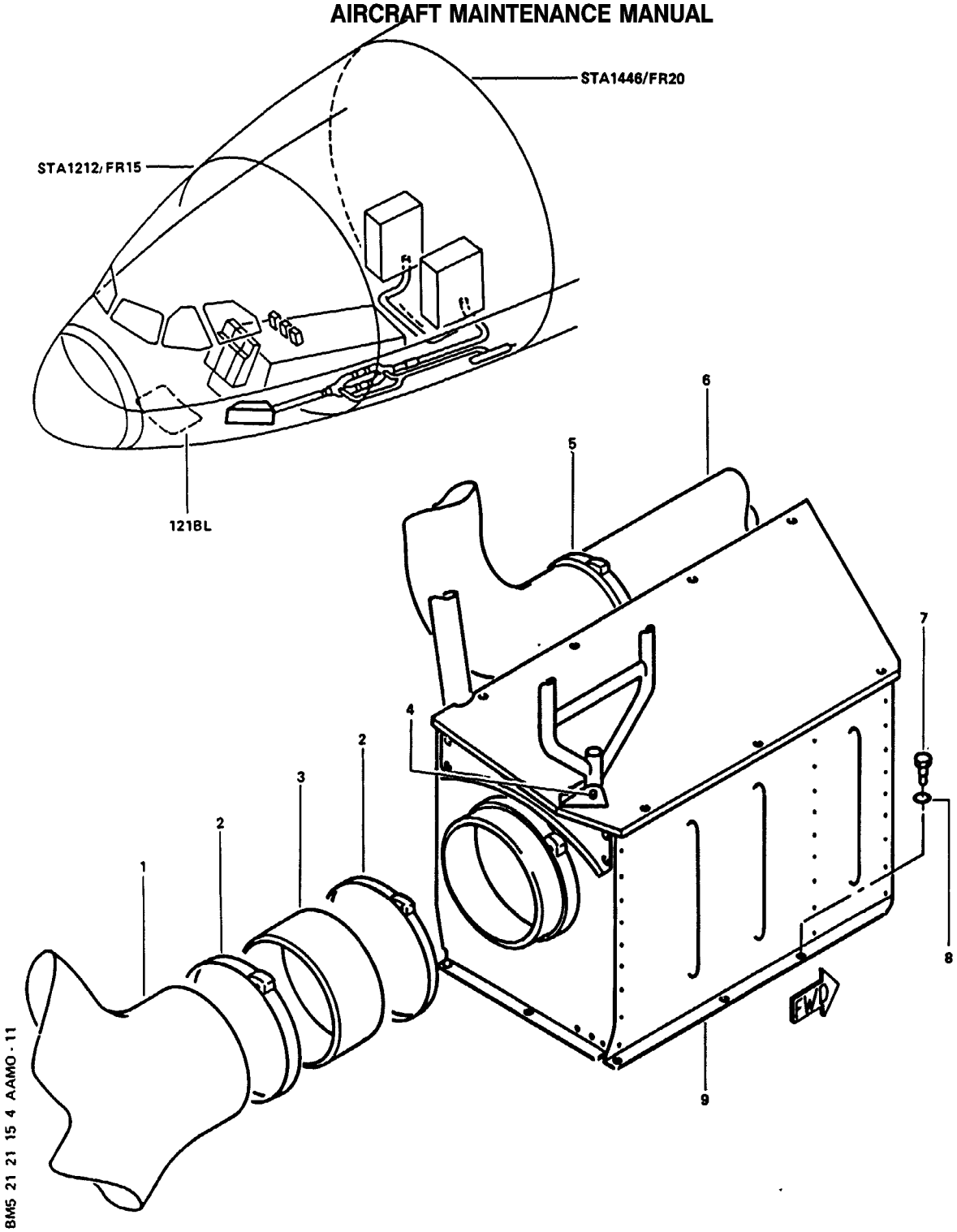
R **ON A/C ALL

A. Job Set-Up
(1)Open access door 121BL.

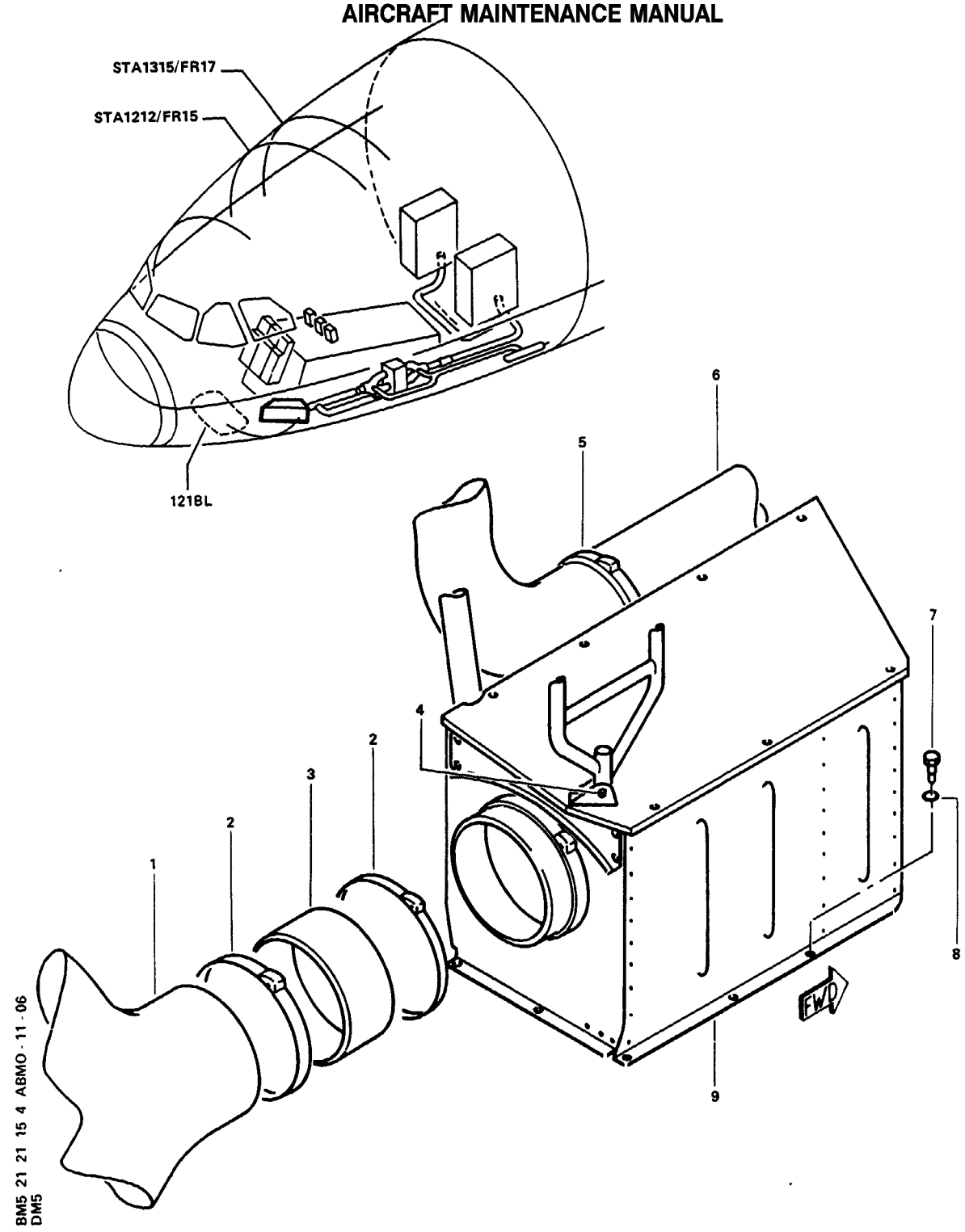
B. Removal
(1)Remove clamps (2) from flexible sleeve (3) and slide flexible sleeve onto duct (1) to free sound reducer.
(2)Remove clamp (5) securing duct (6).
(3)Remove avionics compartment fixed ladder attachment pin (4) on sound reducer.
(4)Remove screws (7), washers (8) and sound reducer (9).
(5)Cap open ends of duct (1).

C. Installation
(1)Remove blanking cap and check for correct condition of flexible sleeve (3).
(2)Clean and inspect sound reducer interface and/or adjacent area.
(3)Install sound reducer (9) and secure with screws (7) and washers (8).
(4)Install and tighten clamp (5) securing duct (6).
(5)Install fixed ladder and attachment pin (4).
(6)Install flexible sleeve (3) ; install and tighten clamps (2).

D. Close-Up
(1)Make certain that working area is clean and clear of miscellaneous items of equipment.
(2)Close access door 121BL.



Sound Reducer 0569
Figure 401



Sound Reducer 0569
Figure 402

SOUND REDUCER AIR INLET FILTER - CLEANING

1. Reason for the Job

R To clean filter at air inlet to sound reducer.

2. Procedure

(Ref. Fig. 701)

A. Job Set-Up

(1)Open access door 121BL.

B. Removal of the Filter Assy

(1)Unlock the 12 studs (3) and remove filter assy (2) from sound reducer (1).

C. Cleaning of the Filter

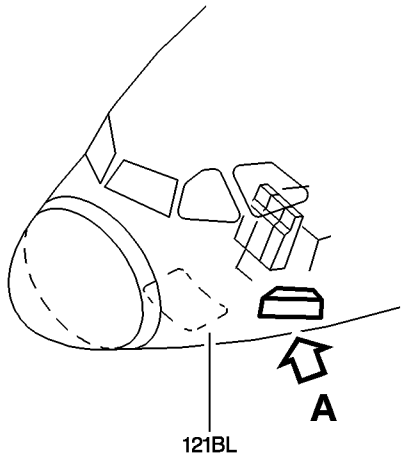
(1)Submerge filter in a 5 - 10 % solution of water detergent (neutral cleaning agent type : KARCHER RM555 or equivalent).
(2)Wash at 40 - 50°C (104 - 122°F) using a soft non metallic brush in order not to damage the anti-corrosion protection.
(3)Rinse with clean water.
(4)Blow out the whole surface of the filter including its frame (make sure that no water remains inside the assembly).
(5)Dry filter assy at 40 - 50°C (104 - 122°F) for two hours approximately.
(6)Inspect filter assy.

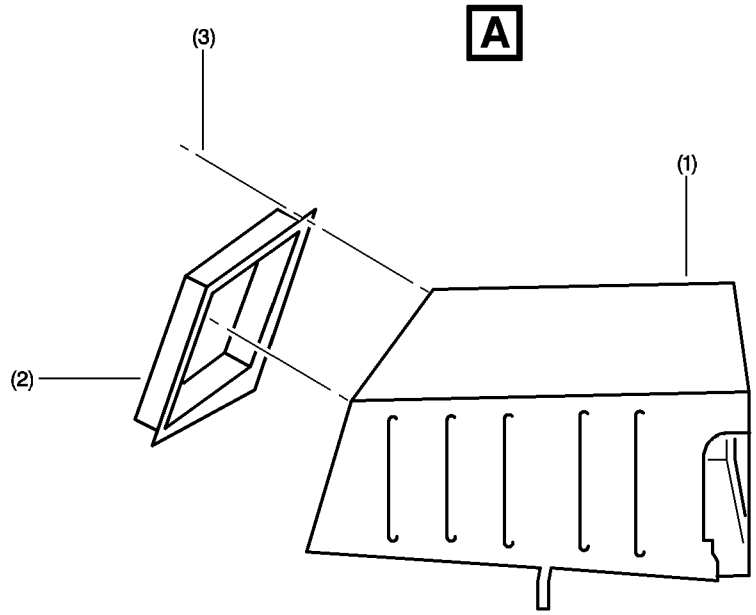
D. Installation of the Filter Assy

(1)Install filter assy (2) on the sound reducer (1) (make sure that the filter assy is in correct position).
(2)Lock the 12 studs (3).

E. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 121BL.





BM5 21 21 15 7 AAM0 00

Filter Assembly
Figure 701

1. Filter Cartridge 0571

A. Procedure

R WARNING : PUT ON GLOVES, A COVERALL WITH A HOOD, GOGGLES AND A PARTICULATE
R RESPIRATOR BEFORE YOU TOUCH THE FILTER. THE FILTER REMOVES SMALL
R PARTICLES (SMOKE, DUST, LINT, FIBERS, POLLEN) AND INFECTIOUS
R MATERIALS (BACTERIA, VIRUSES, MOLD SPORES, FUNGI) FROM THE AIR. THESE
R MATERIALS CAN CAUSE ILLNESS.
R WARNING : DO NOT LET THE FILTER TOUCH YOUR SKIN. DO NOT SHAKE OR HIT THE
R FILTER. DO NOT USE COMPRESSED AIR TO CLEAN THE FILTER OR FILTER
R HOUSING. THIS CAN CAUSE INFECTIOUS MATERIAL TO BECOME AIRBORNE.
R DISCARD THE FILTER IN A PLASTIC DISPOSAL BAG.
R IF YOU DO NOT OBEY THESE INSTRUCTIONS, INFECTIOUS MATERIAL FROM THE
R FILTER CAN CAUSE ILLNESS.
R WARNING : PUT ALL AIR FILTERS THAT YOU REMOVE FROM THE AIRCRAFT INTO PLASTIC
R DISPOSAL BAGS. AIR FILTERS CAN CONTAIN INFECTIOUS MATERIALS WHICH CAN
R CAUSE ILLNESS. OBEY AIRLINE POLICY AND LOCAL HEALTH DEPARTMENT AND
R LAW ENFORCEMENT REGULATIONS FOR DISPOSAL OF INFECTIOUS MATERIALS.

**ON A/C 101-200,

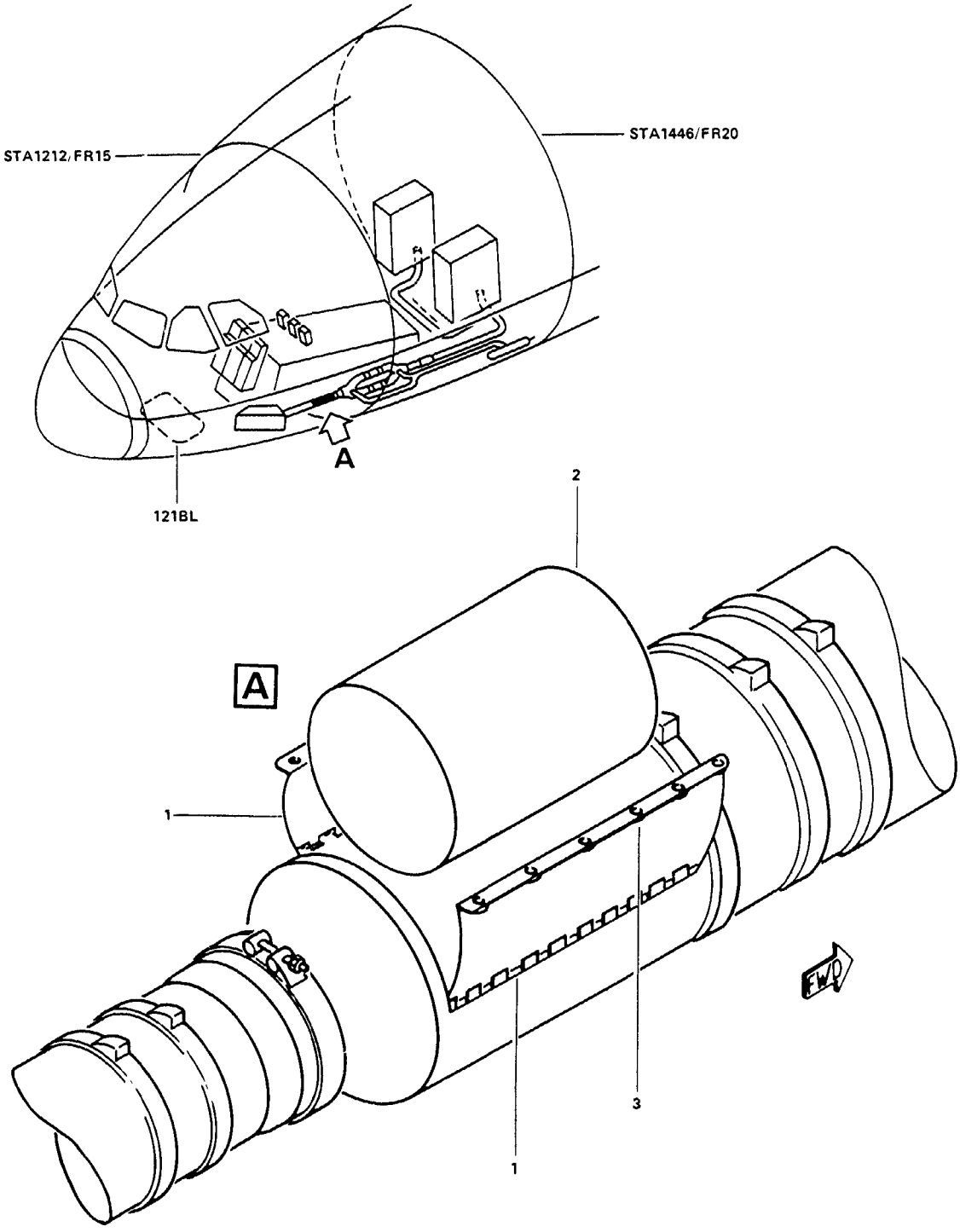
(Ref. Fig. 401)

**ON A/C 001-100,

(Ref. Fig. 402)

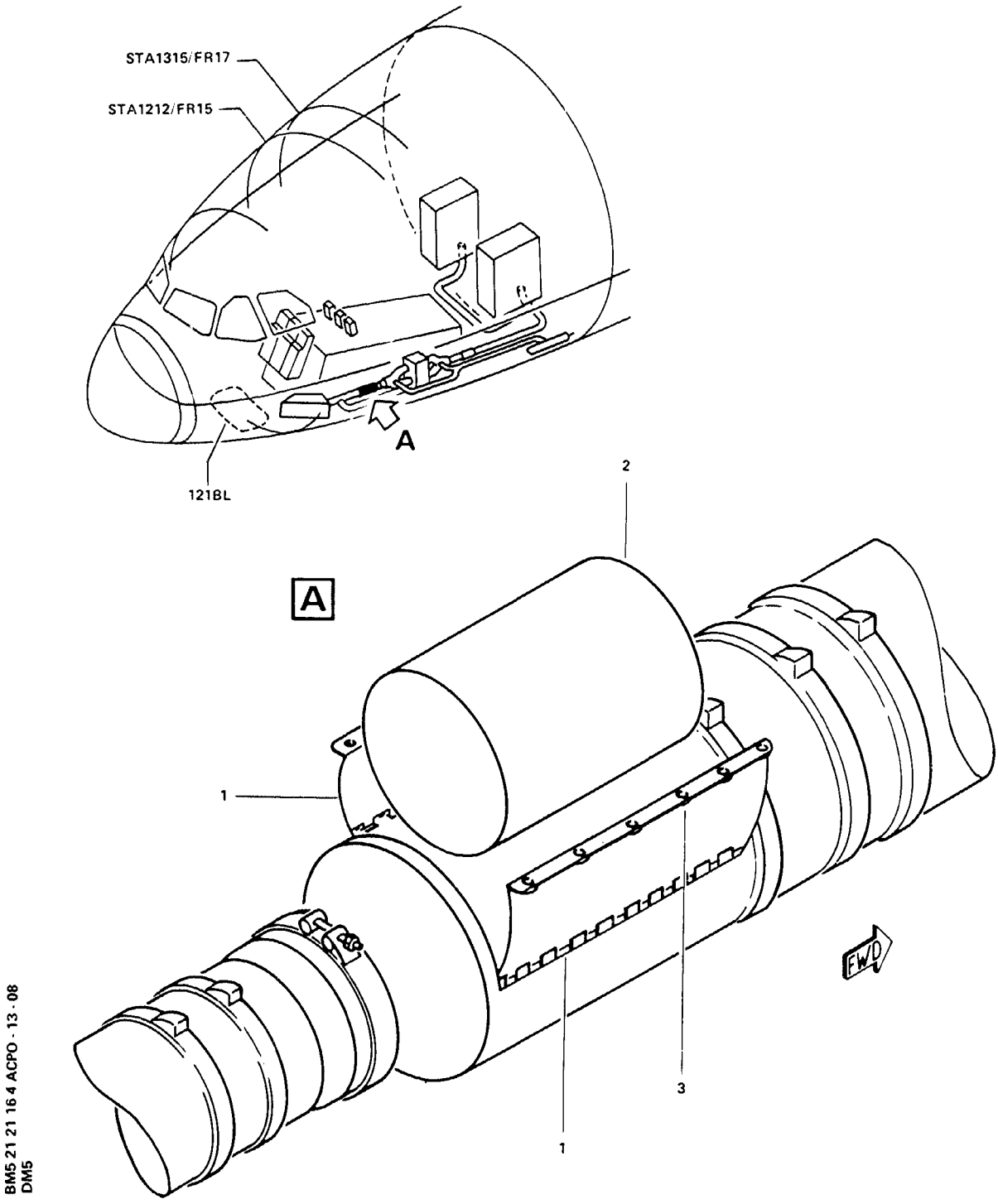
**ON A/C ALL

(1)Job set-up
(a)Open access door 121BL.
(2)Removal
(a)Unlock fasteners (3).
(b)Open panels (1) and remove filter cartridge (2).
(3)Installation
(a)Clean and inspect filter cartridge interface and/or adjacent area.
NOTE : Check for correct operation of air supply check valve A563 ; manually operate flaps and check that they move freely without sticking at opening throughout travel range (no friction points) and seat correctly.
(b)Install filter cartridge (2).
(c)Lock fasteners.
(4)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Close access door 121BL.



Filter Cartridge 0571
Figure 401

R



Filter Cartridge 0571
Figure 402

2. Filter 0570

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Torque Wrench 0.8 m.daN (71 lbf.in.)
(2)	Blanking Plugs/Caps
(3)	O-Ring

B. Procedure

R **ON A/C 101-200,

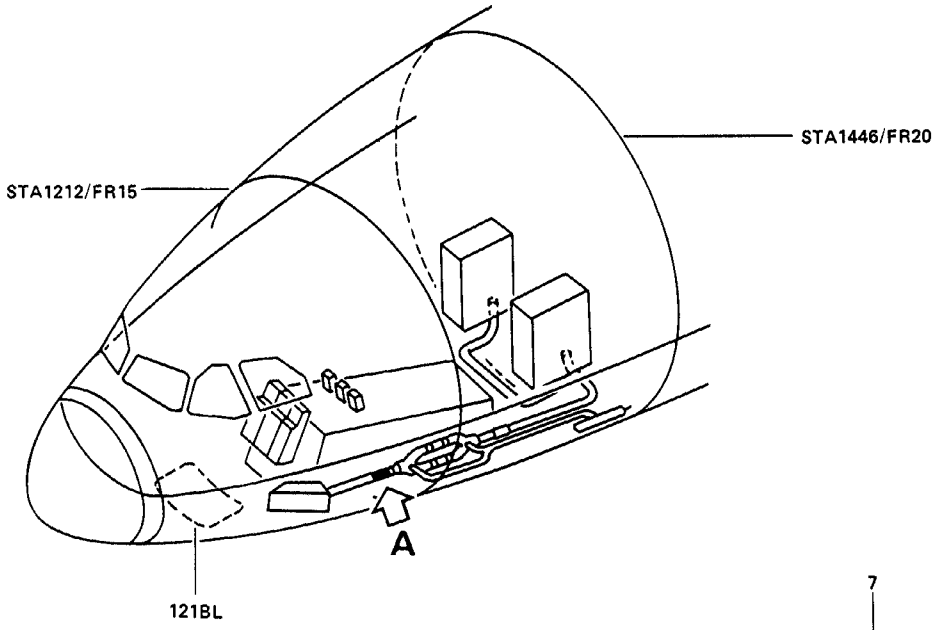
R (Ref. Fig. 403)

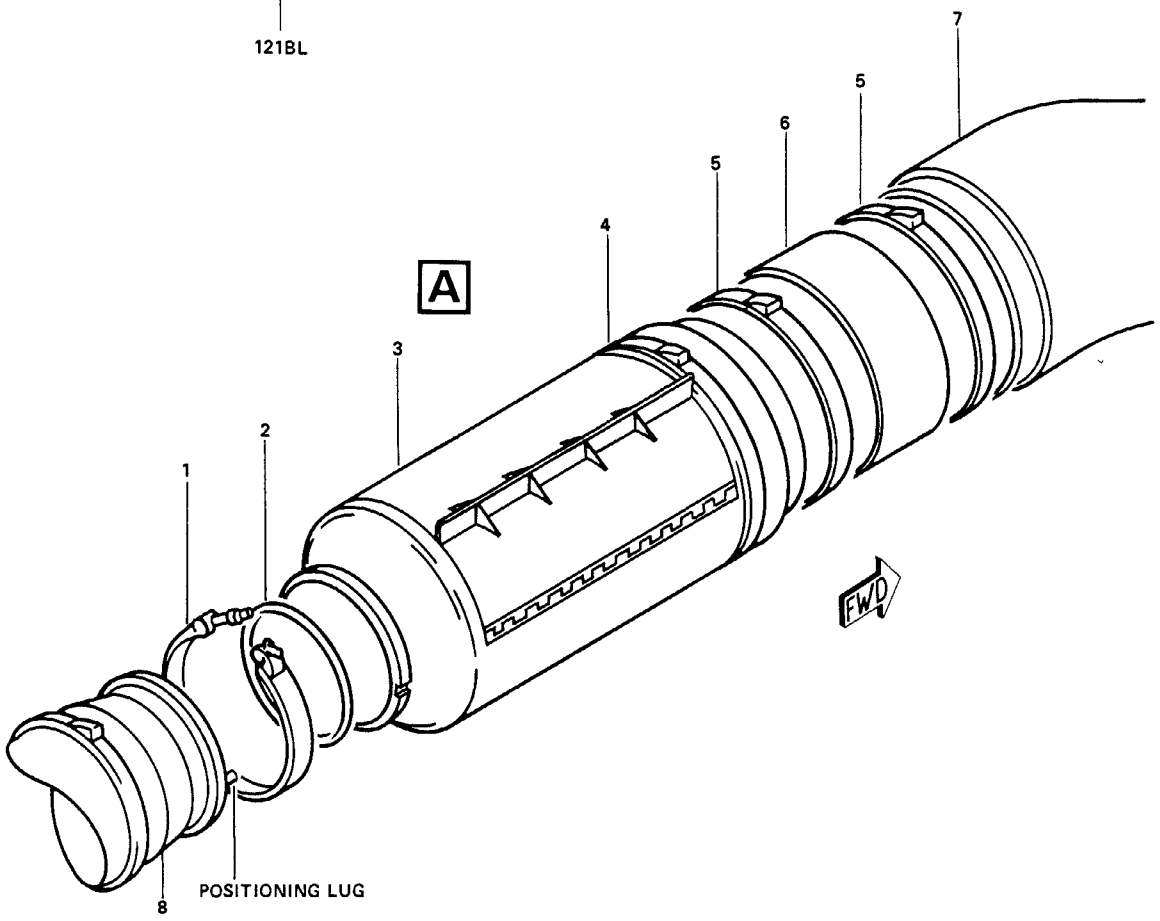
R **ON A/C 001-100,

(Ref. Fig. 404)

R **ON A/C ALL

(1)Job set-up
(a)Open access door 121BL.
(2)Removal
(a)Remove clamps (5) from flexible sleeve (6) and slide flexible sleeve onto duct (7) to free filter (3).
(b)Remove clamp (1).
(c)Hold filter (3), open clamp (4) securing filter to bracket ; remove filter (3).
(d)Remove and discard O-ring (2).
(e)Cap open ends of ducts (7) and (8).
(3)Installation
(a)Remove blanking plugs/caps and check for correct condition of duct flange and flexible sleeve (6).
NOTE : Check for correct operation of air supply check valve A563 ; manually operate flaps and check that they move freely without sticking at opening throughout travel range (no friction points) and seat correctly.
(b)Clean and inspect filter interface and/or adjacent area.
(c)Install O-ring (2) in its groove in filter flange.
(d)Install filter (3) in flexible sleeve (6) and on bracket. Install clamp (4) but do not tighten at this stage.
NOTE : Filter angular positioning is provided by means of a location stud.
(e)Make certain that O-ring is correctly installed in its groove.
(f)Install and tighten clamp (1) ; TORQUE to the value given on clamp.
(g)Install flexible sleeve (6) ; install and tighten clamps (5).
(h)Tighten clamp (4) securing filter to bracket.
(j)Not applicable
(4)Close-up





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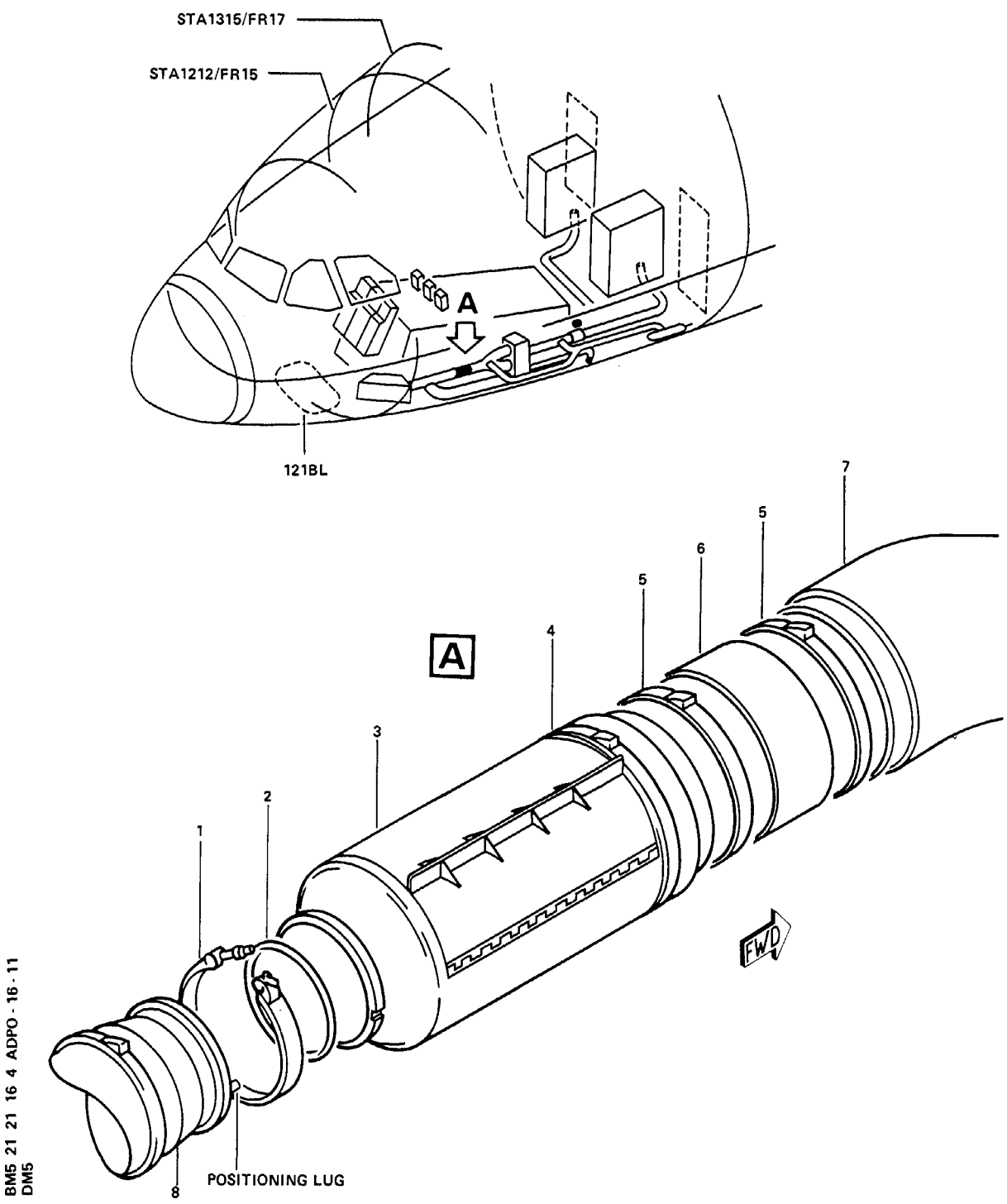
DM5

Filter 0570
Figure 403

R



Filter 0570
Figure 404

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Close access door 121BL.

AIR TEMPERATURE SWITCH 9001HQ - REMOVAL/INSTALLATION

CAUTION : DE-ENERGIZE THE AIRCRAFT ELECTRICAL NETWORK (PROTECTION OF ELECTRIC AND ELECTRONIC COMPONENTS IN AVIONICS COMPARTMENT).

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.6 m (8 ft. 6 in.)
B.	Torque Wrench
C.	Circuit Breaker Safety Clips
D.	O-Ring
E.	Blanking Plugs/Caps
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 21-21-00, P. Block 1	Flight Compartment and Electronics Racks Air Distribution

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Open the following circuit breakers, and attach DO-NOT-CLOSE tags:

PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILLATION/BLOWERS/WARN	76HQ	311/H60

(2)Position access platform.

(3)Open access door 121BL.

B. Removal

(1)Disconnect electrical connector 9001HQ-A.

(2)Remove temperature switch (1) out of duct (3).

(3)Remove and discard O-ring (2).

(4)Put blanking caps on open duct and electrical connector.

C. Installation

(1)Remove blanking plugs/caps from duct and electrical connector.
Check for correct condition of duct flange and electrical connector.

(2)Clean and inspect temperature switch and adjacent area.

(3)Install O-ring (2) on temperature switch (1).

(4)Install temperature switch (1) into duct (3) boss paying attention not to overtighten switch.

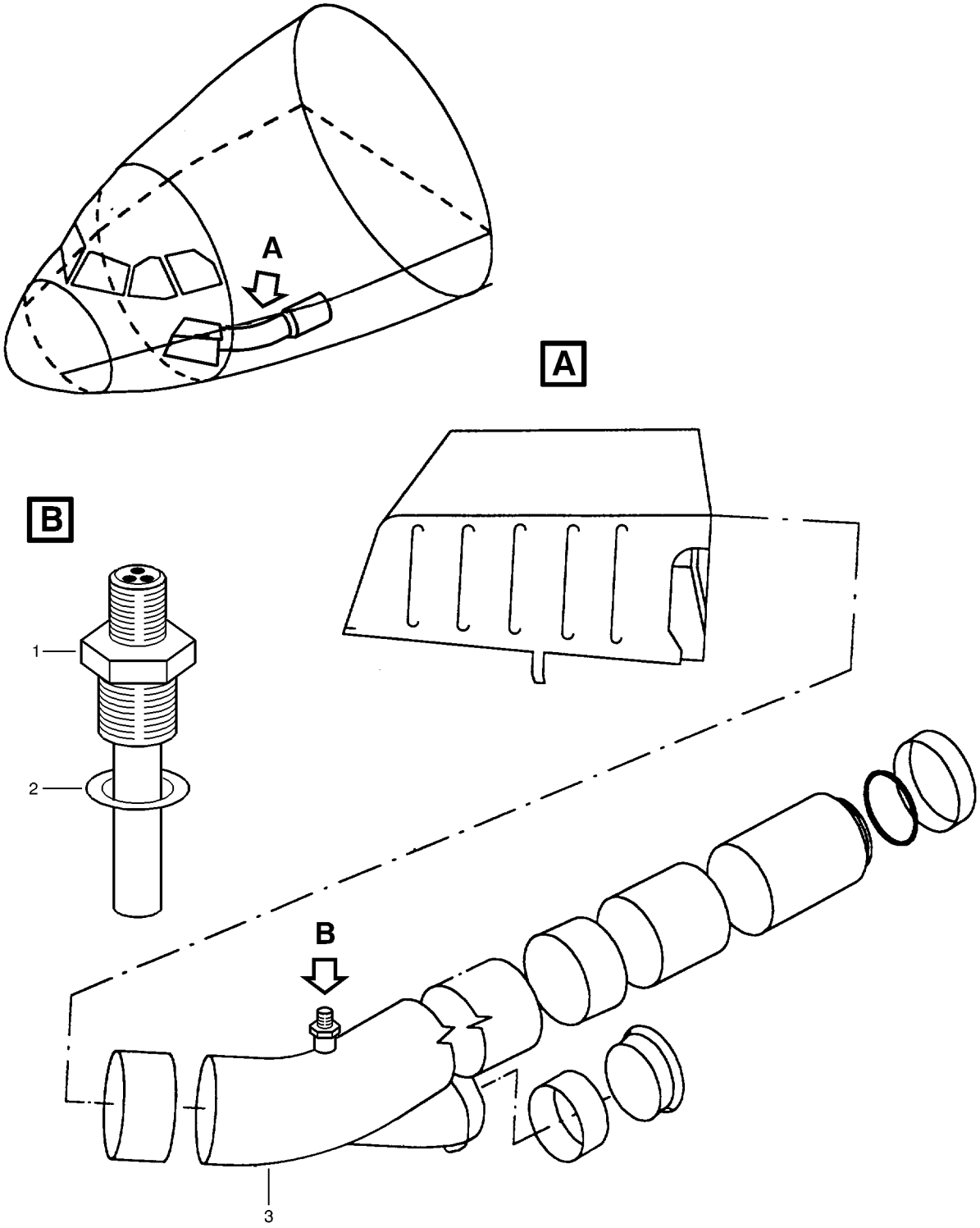
(5)Connect electrical connector to temperature switch (1).

(6)Remove safety clip and tag and close circuit breaker 76HQ.

D. Test

Initial conditions :

- circuit breakers closed. Particularly those associated with ventilation



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Air Temperature Switch
Figure 401

- correct electrical power supply.

NOTE : INS RACK VENT warning light on interphone box and mechanic call horn are not activated if ENG1 (ENG2) low oil pressure switch is open, or if any electrical connector is disconnected. (Ref. 79-33-00, P. Block 1).

ACTION	RESULT
	Blower operates at low speed if the electronics racks temperature is below 37°C.
1. Disconnect connector from temperature switch 9001HQ and install a jumper between pins A and B.	- Blower operates at high speed.
2. On temperature switch 9001HQ : - remove jumper between pins A and B of connector and connect connector to switch 9001HQ	- Blower operates at low speed.

NOTE : If blower runs at high speed after connection of connector on temperature switch, check that the air temperature in the electronics racks is below 37°C. If temperature is below 37°C remove temperature switch from duct and cool it down to 20°C ; the blower should now operate at low speed (switch closes at 40°C ±3° and opens at 24°C ±3°).

E. Close Up

(1)On maintenance panel 472VU, place ANN LT switch in OFF position.
(2)De-energize the aircraft electrical network (Ref.24-41-00, P. Block 301).
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Close access door 121BL.
(5)Remove access platform.

WINDSHIELD VENTILATION CONTROL ASSY - REMOVAL/INSTALLATION

CAUTION : DE-ENERGIZE THE AIRCRAFT ELECTRICAL NETWORK (PROTECTION OF ELECTRIC AND ELECTRONIC COMPONENTS IN AVIONICS COMPARTMENT).

1. Reason for the Job
Removal/Installation of the windshield control lever cable.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.6 m (8 ft. 6 in.)
B.	Blanking Plugs/Caps
C.	File
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

3. Procedure
(Ref. Fig. 401)
(Ref. Fig. 402)

A. Job Set-Up
R (1)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Position access platform at the access door 121BL.
(3)Open access door 121BL.

B. Removal
(1)Turn the bolts (1) one quarter turn.
(2)Pull the panel 419VU (2) from its housings.
(3)Disconnect the electrical connector (3).
(4)Loosen the screw (5).
(5)Remove the handle-end (4).
(6)Remove the bolts (7) and the washers (8).
(7)Remove the nuts (12).
(8)Remove the bolts (10) and the washers (11).
(9)Remove the clamp (13).
(10)Disengage the duct (14).
(11)Remove the panels (9) and (6).
(12)Remove the cotter pin (15) and loosen the nut (16).
(13)Remove the cable (17) from the special pin (18).
(14)Remove the cotter pin (22) and loosen the nut (23).
(15)Remove the cable (17) from the special pin (24).
(16)Remove the cable (17).
(17)Cap open duct end and electrical connector (3).

C. Installation
(1)Remove blanking plug/cap. Check for correct condition of duct and electrical connector (3).
(2)File the end of the cable (17) to make it round.

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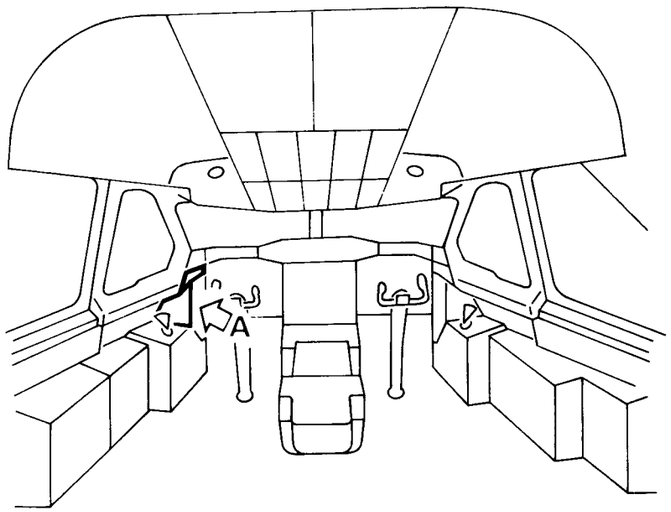

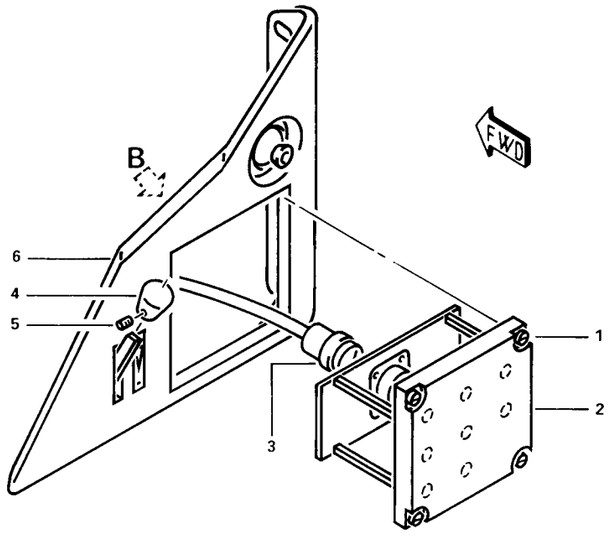

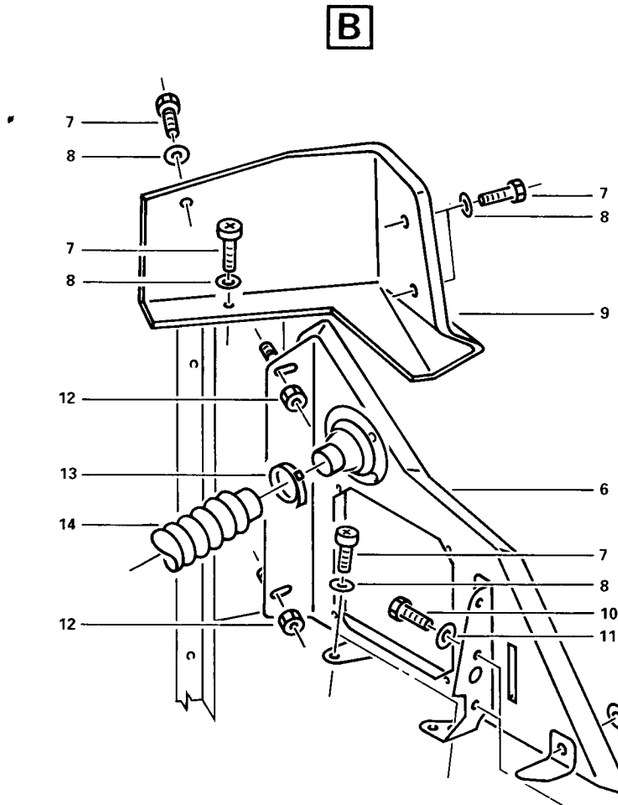

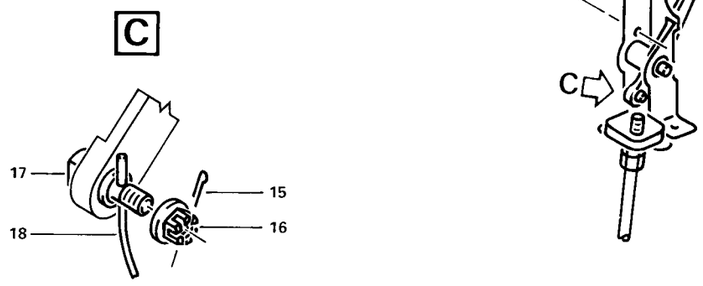

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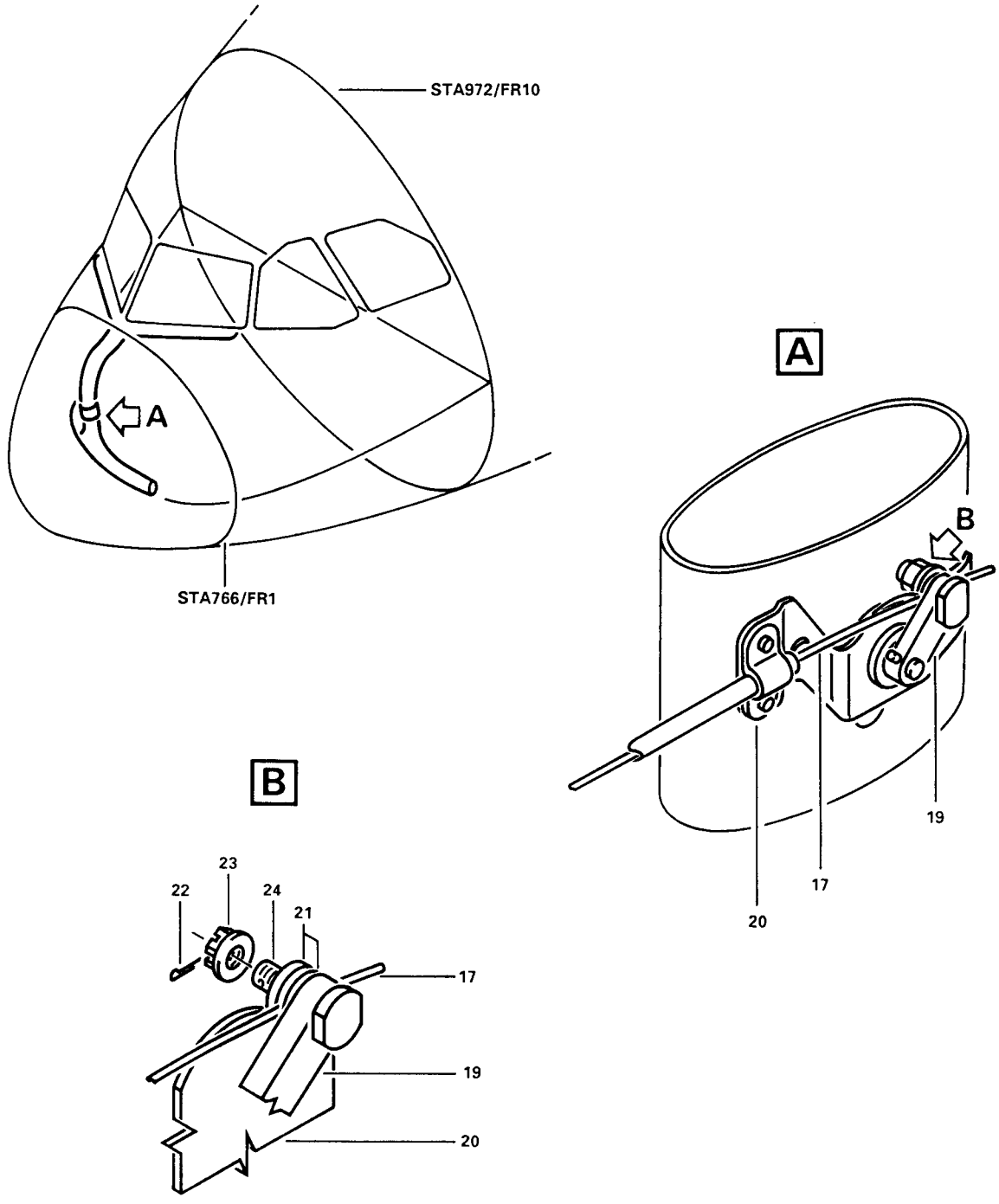
Control Lever - Flight Compartment Location
Figure 401



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Control Lever - Avionics Compartment Location
Figure 402

(3)Insert the cable (17) in the sleeve.
(4)Put the end of the cable (17) in the hole of the special pin (18).
(5)Tighten the nut (16) and safety with cotter pin (15).
(6)Install the panels (9) and (6).
(7)Install the duct (14) in position.
(8)Install the clamp (13) and tighten.
(9)Install the washers (10), the bolts (11) and tighten.
(10)Install the nuts (12) and tighten.
(11)Install the washers (8), the bolts (7) and tighten.
(12)Install the handle-end (4) and tighten the screw (5).
(13)Connect the electrical connector (3).
(14)Install the panel 419VU (2) in its housings.
(15)Turn the bolts (1) one quarter turn.
(16)Push the cable (17) in the sleeve with the control lever set fully upwards to the FLOW+ position.
(17)On the ventilation ducting, put the flap of the flow limiter in the fully open position (flap in vertical position), special pin (24) of the flow limiter control lever (19) set to the right, in contact with the bracket assy (20).
(18)Put the end of the cable (17) in the hole of the special pin (19) between the two washers (21).
(19)Tighten the nut (23) and safety with the cotter pin (22).
(20)Operate the control lever and make sure that the flap moves smoothly to the open or closed position.

D. Close-Up
(1)Remove all ground handling and maintenance equipment, standard and special tools, together with ground power equipment, all access equipment and miscellaneous items.
(2)Close access door 121BL.
(3)Remove access platform.
(4)Restore aircraft and system to normal operating condition.

FLIGHT COMPARTMENT CEILING AIR OUTLET - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking Plugs/Caps

2. Procedure

R (Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

- for HYD PWR panel 427VU :
  On panel 128VU, all circuit breakers associated with HYDRAULIC.
- for Flight Controls panel 428VU :
  On panel 127VU, all circuit breakers associated with FLT CTL.
- for COMPT TEMP panel 437VU :
  On panel 22VU, all circuit breakers associated with COMPT TEMP.
  On panel 125VU, all circuit breakers associated with COMPT TEMP.

R B. Removal

R (1)Remove rear ceiling panel :
R - (12) then (13) for LH side,
R - (1) for RH side.
R (2)Remove clamp (4) from LH(RH) air outlet (8) on overhead panel.
R (3)Release the three quarter-turn fasteners on LH(RH) furnishing panel (2) and remove panel.
R (4)Remove the two screws from CAPT (F/O) reading light panel assy (3). Disconnect CAPT (F/O) reading light and pull panel assy (3).
R (5)Disengage and remove lateral ventilation louvers (7) from air outlet (8).
R (6)Remove HYD PWR panel 427VU and Flight Controls panel 428VU on CAPT side (COMPT TEMP panel 437VU on F/O side). Disconnect and cap electrical connectors.
R (7)Free upper plate (9) from air outlet (8) : remove one screw (11) and washer (10) from plate (9) and loosen the other screw to rotate plate (9).
R (8)Remove the four locking screws (5) and washers (6) located in air outlet (8).
R (9)Remove air outlet (8).
R (10)Cap open duct ends.

R C. Installation

R (1)Remove blanking plugs/caps and check for correct condition of electrical connectors and duct ends.
R (2)Clean and inspect air outlet (8) and/or adjacent area.
R (3)Position air outlet (8).
R (4)Install washers (6), locking screws (5) and tighten.
R (5)Rotate upper plate (9) of air outlet (8). Install washer (10), screw (11)

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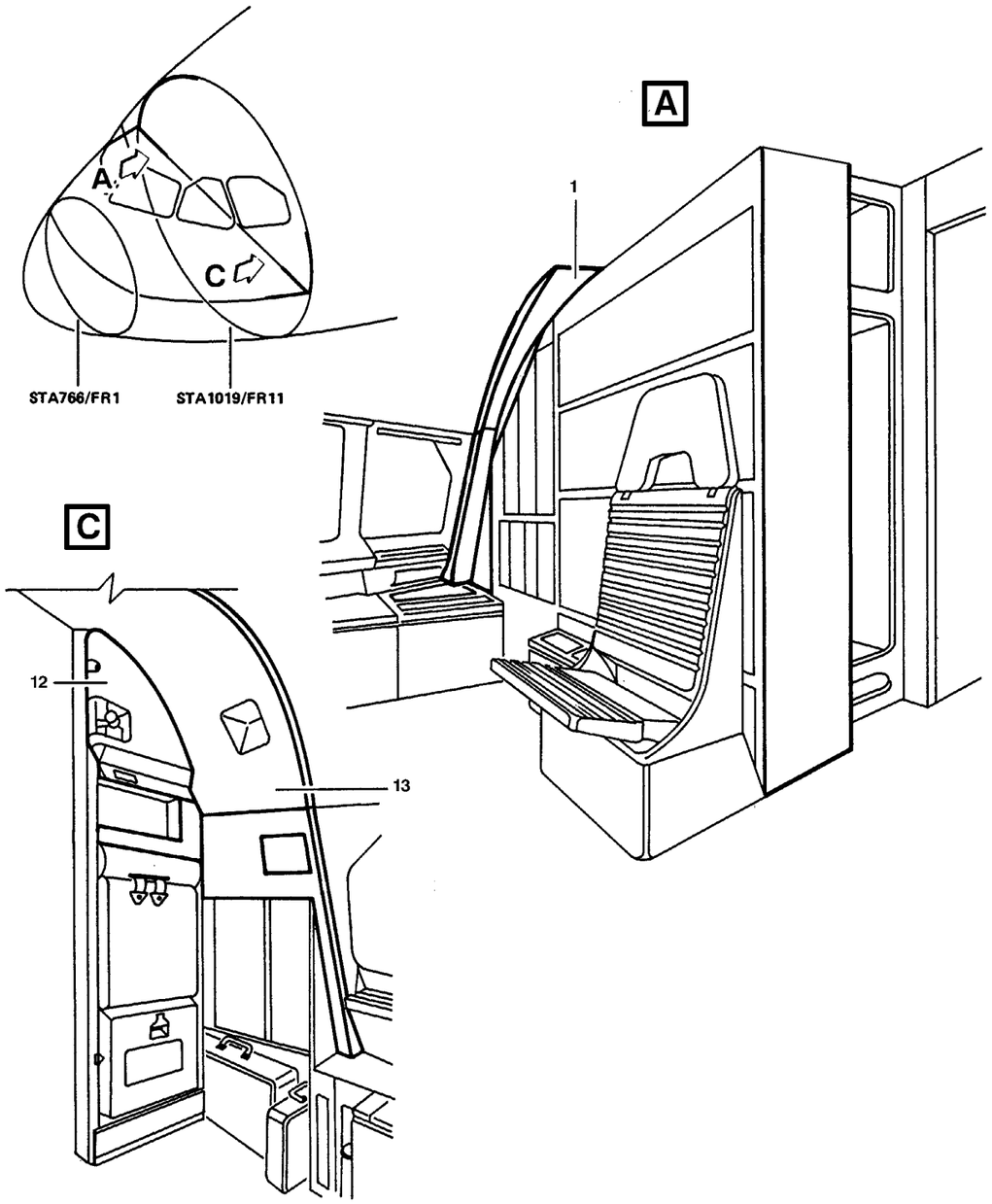

Flight Compartment Ceiling Air Outlet
Figure 401

R

R and tighten the two screws (11).
R (6)Connect electrical connectors and install HYD PWR panel 427VU and Flight
R Controls panel 428VU on CAPT side (COMPT TEMP panel 437VU on F/O side).
R (7)Install lateral ventilation louvers (7) on air outlet (8).
R (8)Connect CAPT (F/O) reading light and install the two screws on CAPT (F/O)
R reading light panel assy (3) and tighten.
R (9)Install LH(RH) furnishing panel (2) and tighten the three quarter-turn
R fasteners.
R (10)Install clamp (4) on LH(RH) air outlet (8).
R (11)Install rear ceiling panel :
R - (13) then (12) for LH side,
R - (1) for RH side.

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove safety clips and tags and close the following circuit breakers :
- for HYD PWR panel 427VU :
On panel 128VU, all circuit breakers associated with HYDRAULIC.
- for Flight Controls panel 428VU :
On panel 127VU, all circuit breakers associated with FLT CTL.
- for COMPT TEMP panel 437VU :
On panel 22VU, all circuit breakers associated with COMPT TEMP.
On panel 125VU, all circuit breakers associated with COMPT TEMP.
(3)Restore aircraft and system to normal operating condition.

CABIN DISTRIBUTION - DESCRIPTION AND OPERATION

1. General

Each cabin temperature zone is supplied with conditioned air from a separate distribution duct network branching out from the hot and cold air manifolds. Riser ducts for each zone pass between the fuselage skin and the cabin interior sidewall panels to the area above the cabin ceiling panels, where connection to the zone main supply ducts is made. The main supply ducts then branch outward to each side of the cabin, routing air in equal proportions to cabin air outlets above the sidewall overhead stowage compartments and passenger/crew doors.
With the packs in the normal mode, approximately 40 % of the air exiting the outlets is recirculated cabin air that is force fed into the main supply ducts by electrical fans. The portion of recirculated air increases to 53 % with the packs selected for the economical mode.

2. Component Location

(Ref. Fig. 001)

R **ON A/C ALL

R Post SB 21-2057 For A/C ALL

R (Ref. Fig. 002)

R **ON A/C ALL

(Ref. Fig. 003)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
1HG	FAN-CABIN, FWD		233		21-22-11
2HG	RELAY-PWR CTL	282VU	122	121BL	
3HG	RELAY-FAILURE CTL	282VU	122	121BL	
5HG	FAN-CABIN, MID		243		21-22-11
6HG	RELAY-PWR CTL	282VU	122	121BL	
7HG	RELAY-FAILURE CTL	282VU	122	121BL	
9HG	FAN-CABIN, AFT		253		21-22-11
10HG	RELAY-PWR CTL	282VU	122	121BL	
11HG	RELAY-FAILURE CTL	282VU	122	121BL	
13HG	P/BSW-CABIN FAN	438VU	212		
15HG	MFA-FWD CABIN	472VU	212		
16HG	MFA-MID CABIN	472VU	212		
17HG	MFA-AFT CABIN	472VU	212		
21A406	CHECK VALVE-FWD		233		21-22-13
21B406	CHECK VALVE-MID		243		21-22-13
21C406	CHECK VALVE-AFT		254		21-22-13
21A409	FILTER-DUST SEPARATOR		233		21-22-12
21B409	FILTER-DUST SEPARATOR		243		21-22-12
21C409	FILTER-DUST SEPARATOR		254		21-22-12

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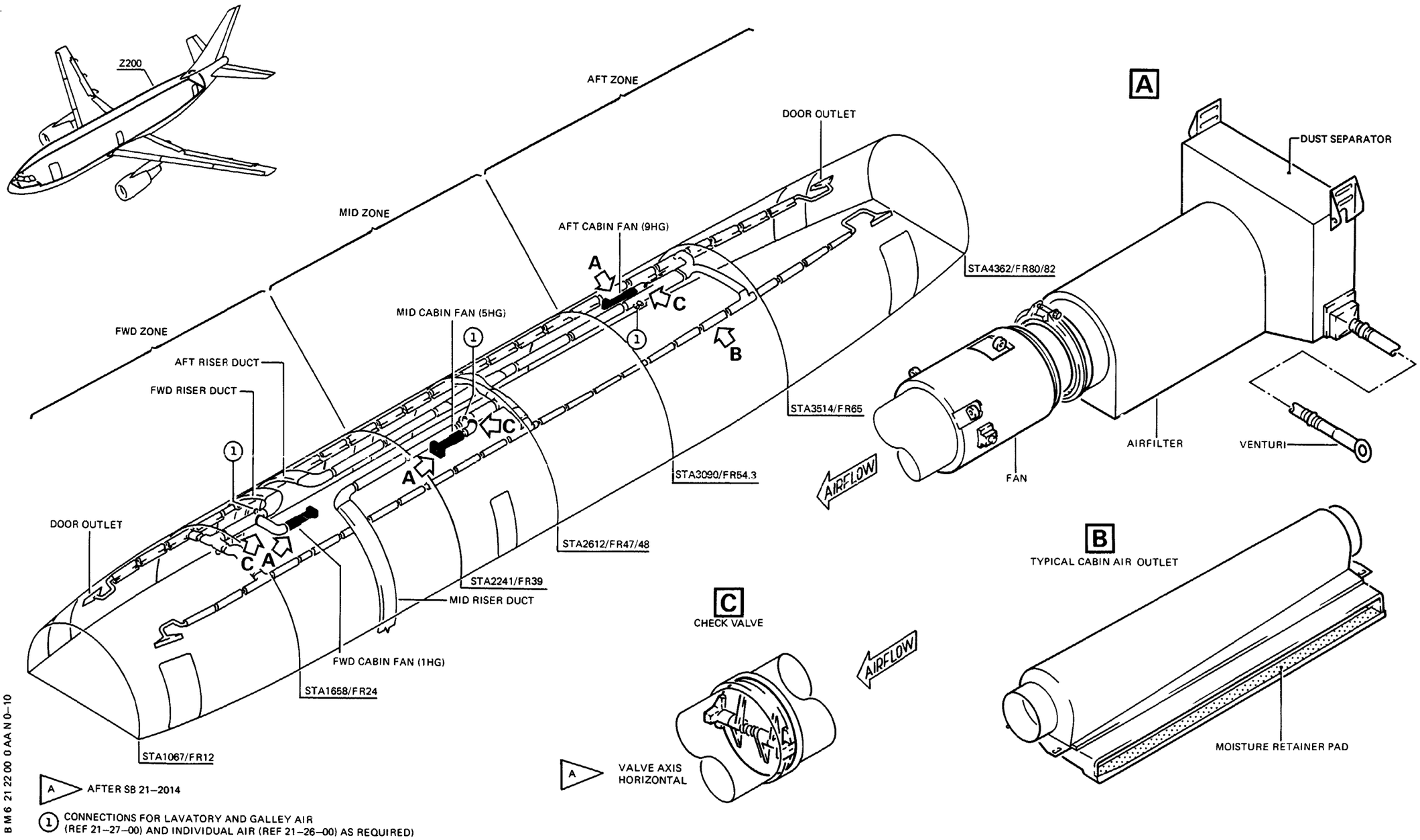

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General Layout
Figure 001

EFFECTIVITY: ALL

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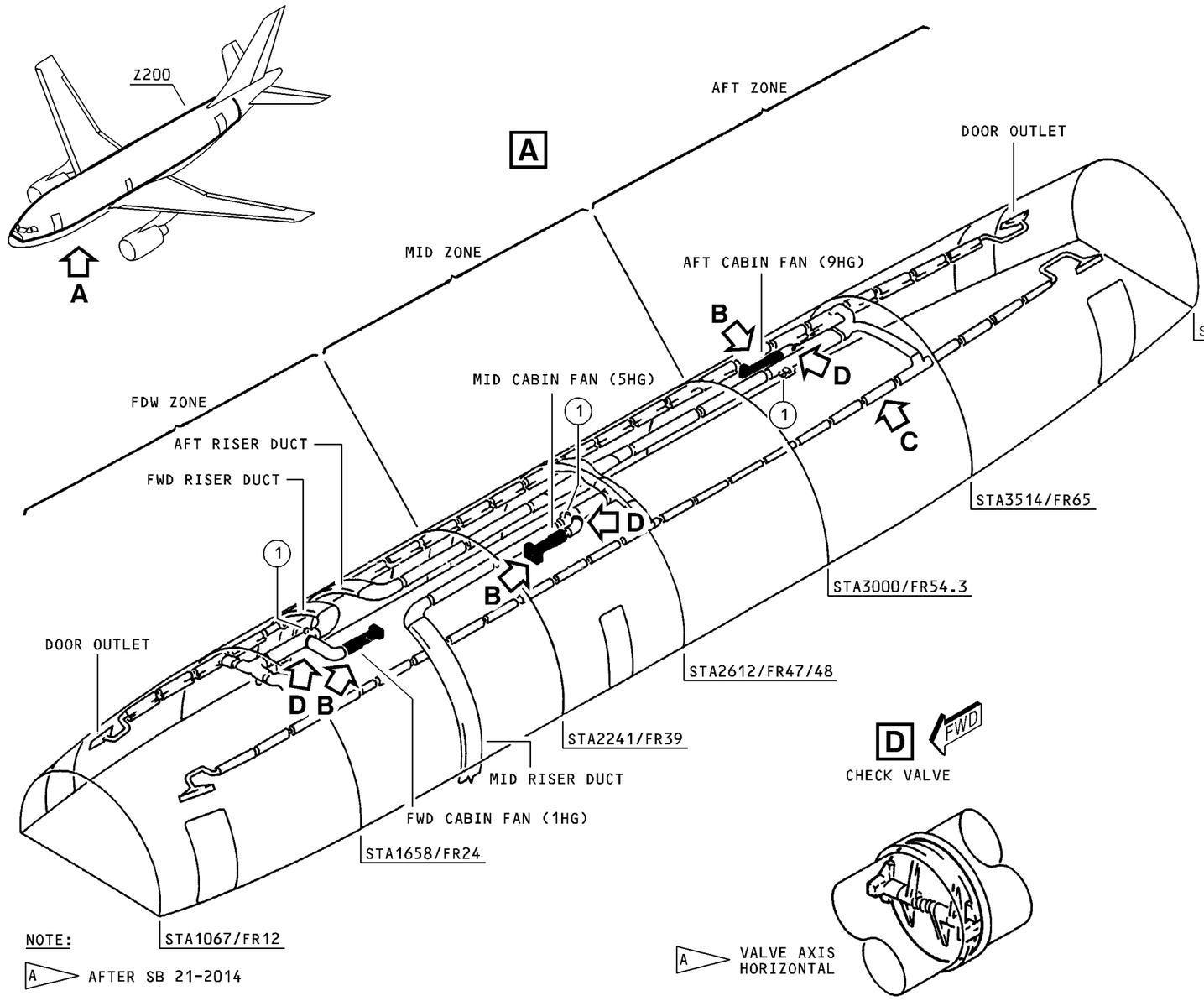

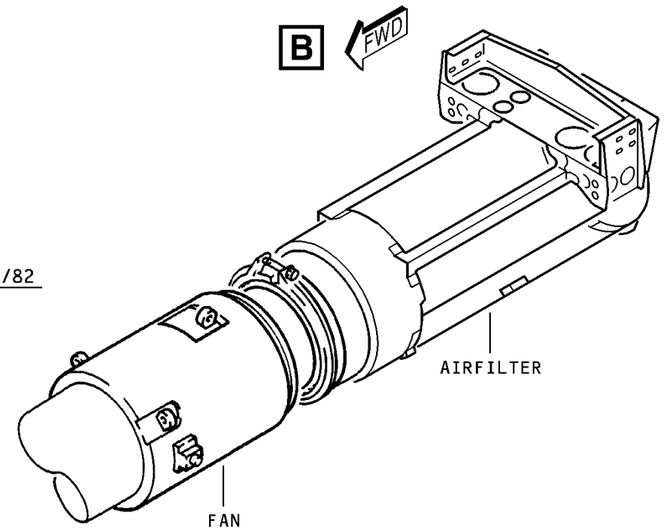

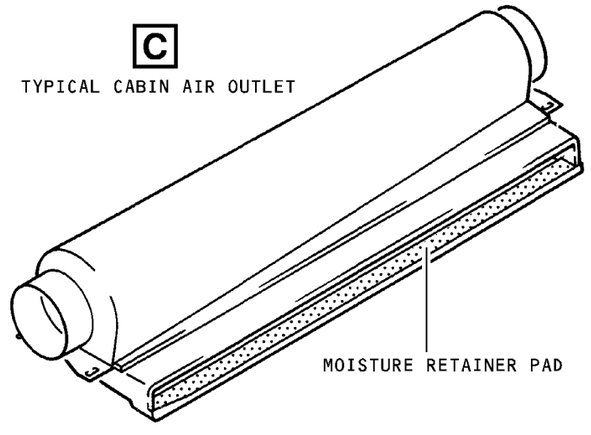

NOTE:

A AFTER SB 21-2014

(1) CONNECTIONS FOR LAVATORY AND GALLEY AIR (REF 21-27-00) AND INDIVIDUAL AIR (REF 21-26-00) AS REQUIRED

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R

General Layout
Figure 002

EFFECTIVITY: ALL

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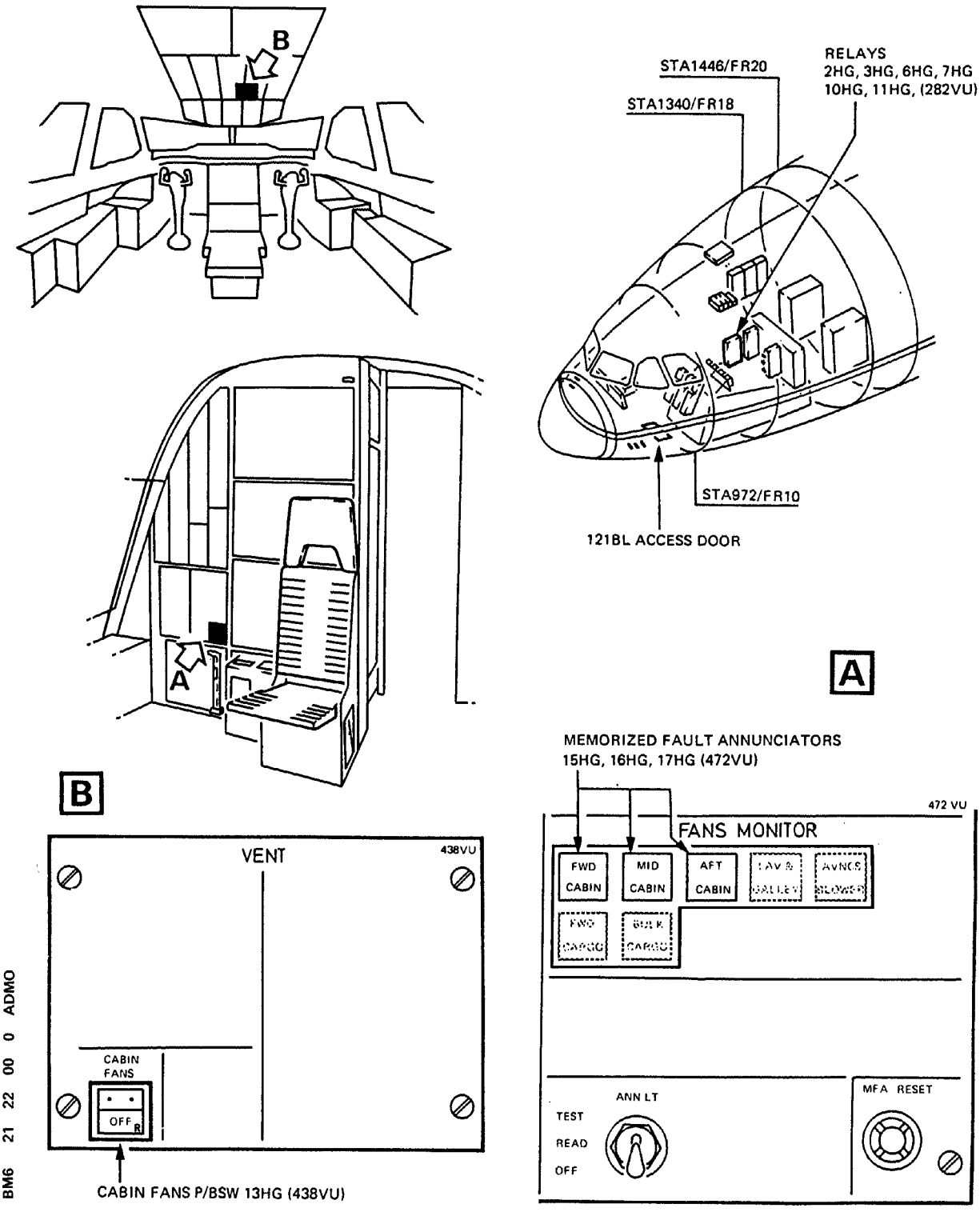

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Controls and Indicators
Figure 003

3. System Description

A. Distribution Ducting
(Ref. Fig. 001)

R **ON A/C ALL

R Post SB 21-2057 For A/C ALL

R (Ref. Fig. 002)

R **ON A/C ALL

The distribution ducting in each zone is similar, in that each zone is equipped with a riser duct, main supply ducts and cabin air outlets. In addition, passenger/crew door outlets are connected to the FWD and AFT zone cabin air outlets.
All fresh air ducts are manufactured from resin and glass fiber laminate with metal sleeves bonded at each end for duct interconnection. These ducts are covered by insulation shells manufactured from either polyethylene foam or glass wool covered with Hypalon material. The ducts are attached to fuselage structural brackets by means of clamps. To allow for expansion and contraction, the ducts are interconnected by bellows manufactured from silicone laminate re-enforced with glass fiber.
The cabin and door air outlets are designed so that drafts are minimized at the seat top level, while simultaneously air is distributed equally throughout the entire cabin length. The cabin air outlets are designed to retain a limited quantity of condensed water by use of a felt pad strip positioned in a lip at the outlet. This felt is replaceable and held in position with double-backed tape.

B. Air Recirculation
(Ref. Fig. 001)

R **ON A/C ALL

R Post SB 21-2057 For A/C ALL

R (Ref. Fig. 002)

R **ON A/C ALL

Recirculation of a portion of the cabin air to supplement the fresh air supply, is provided in each zone by an electric fan. A check valve is located in the ducting between each fan and zone main supply duct to prevent reverse air flow.
An air filter is fitted to the inlet end of each fan to separate dust particles from the recirculated air.

C. Controls and Indicators
(Ref. Fig. 003)
The cabin fans are controlled by the **CABIN FANS** switch **13HG** located on the **VENT** panel at the cockpit overhead panel. Should any fan fail to function, a fault annunciator light is provided for each fan in the **FANS MONITOR** section of the maintenance panel.

4. Component Descriptions

A. Cabin Fans 1HG, 5HG and 9HG.
Each cabin fan consists of a three-phase squirrel cage induction motor which drives a cast aluminum fan wheel having fourteen high-efficiency blades. The fan is designed for continuous operation at approx. 7800 rpm. Thermo switches, fitted to the fan motor stator, isolate the power supply to the fan, if the stator temperature reaches 90° C (194° F).
Each fan is fitted with vibration dampener eyelets for installation to the aircraft structure above the cabin ceiling panels. Arrows on the fan casing denote direction of rotation and air flow direction. A duct is then used to connect each fan to the appropriate zone main supply duct.

B. Check Valve
A check valve is installed, with the valve axis horizontal, at the junction of the fan duct and main supply duct in each zone. The check valve is designed to allow for a one-way only direction of air flow.
Each check valve is of the two semi-circular butterfly flap type with the flaps held in the closed position by a spring. Airflow in the proper direction will override the spring tension, allowing the flaps to open.

C. Air Filters
Each air filter consists of a filter housing and a swirl chamber. Inside the swirl chamber dust particles are separated from the air flow and dumped overboard via a scavenge air connection, a scavenge air tube and a venturi device, which is located on the fuselage surface.
The filter housing contains the filter element. To gain access to the filter element, the lower surface of the filter housing is provided with an access door.

R **ON A/C ALL

R Post SB 21-2057 For A/C ALL

R C. Air Filters
R Each air filter consists of a filter housing. Inside
R The filter housing contains the filter element. To gain access to the
R filter element, the lower surface of the filter housing is provided with
R an access door.

**ON A/C ALL

5. Cabin Fan Operation

R **ON A/C 101-101, 103-200,

(Ref. Fig. 004)

**ON A/C 001-100, 102-102,

R

(Ref. Fig. 005)

**ON A/C ALL

A. Normal Operation
When the CABIN FANS pushbutton switch 13HG is pressed, 28 V DC is supplied from busbar 104PP via circuit breaker 14HG to energize the power relays 2HG, 6HG and 10HG. The power relays close to energize the fans with three-phase 115 V AC from busbars 202XP and 205XP via circuit breakers 4HG, 8HG and 12HG. The ground returns for the power relays are via the respective fail control relay and internal thermo switches for each fan.

B. Malfunction Detection
If the fan motor stator temperature rises to a temperature of 90° C (194° F), the thermo switches open to de-energize the power relay, therefore isolating the fan power supply. The failure control relay closes the ground return to the appropriate Memorized Fault Annunciator (MFA) circuit WB (Ref. 33-17-00) after a three-second delay. To reactivate the fan, the CABIN FANS pushbutton switch must be selected OFF, indicated by illumination of the OFF/R legend, and then returned to the normal position. Resetting the fan should only be accomplished after the cause of the malfunction has been eliminated.

C. Test Capability
The only internal system test available for the cabin fans is the annunciator light test circuit LP (Ref. 33-14-00).

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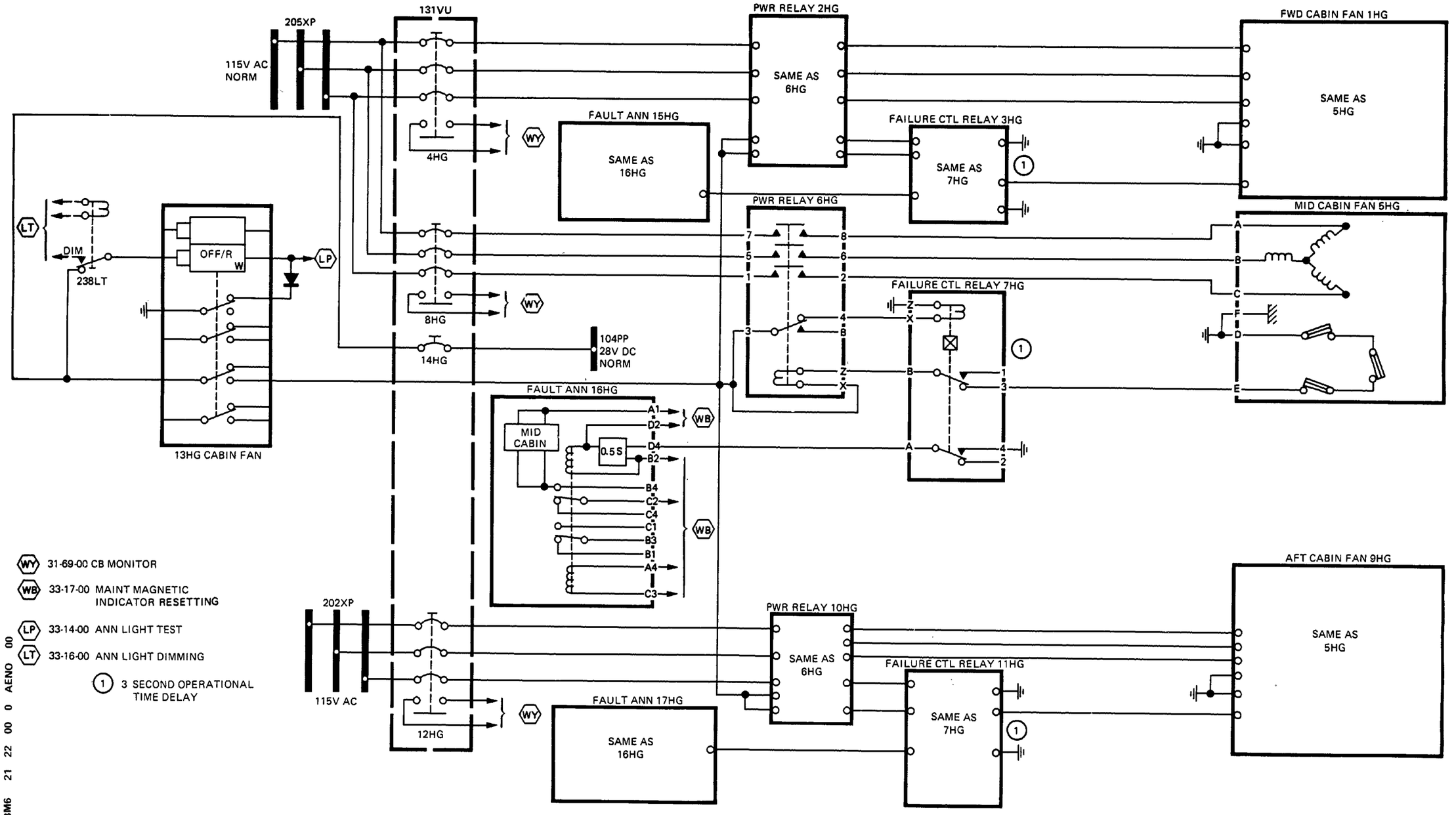
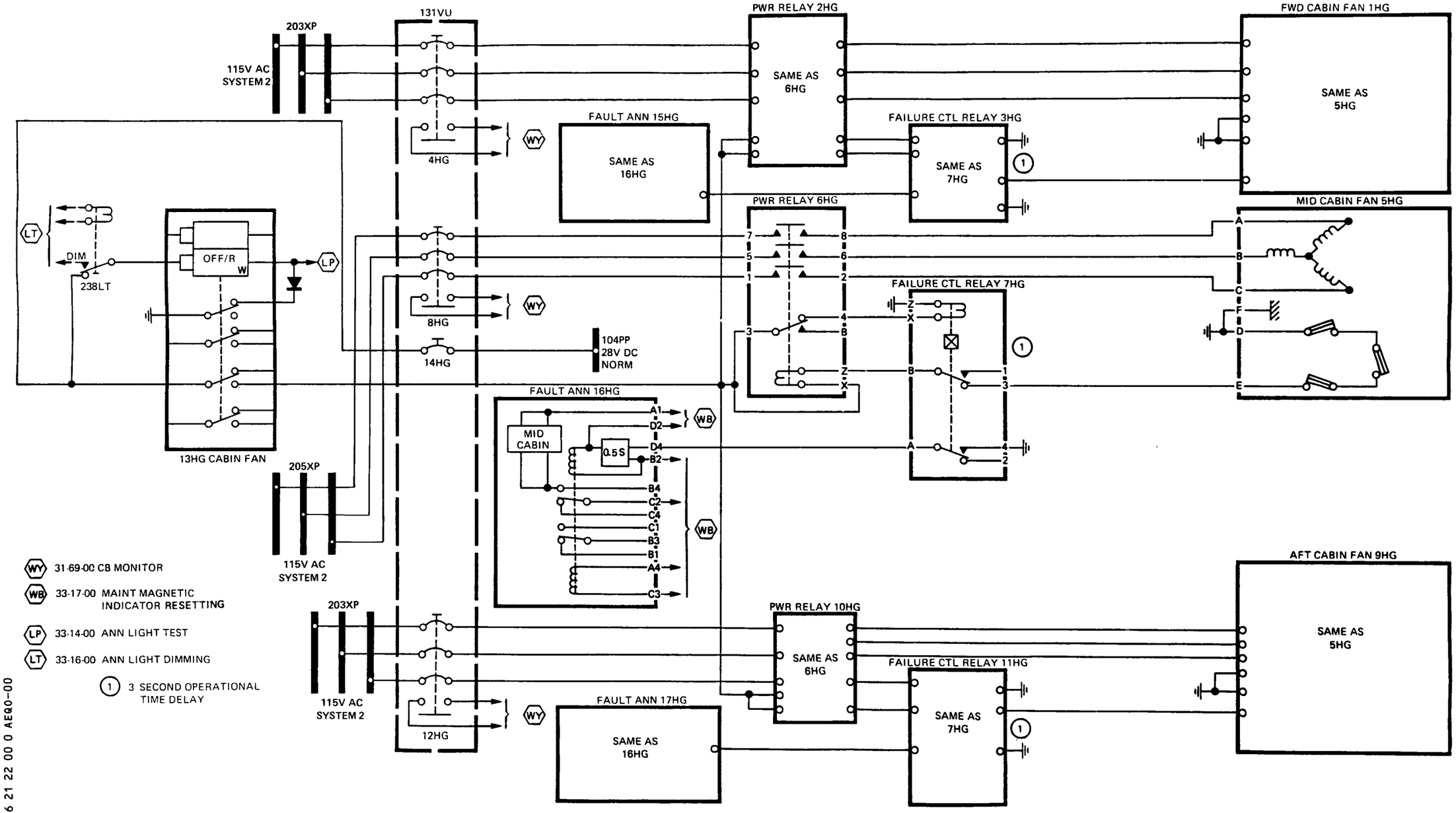


Cabin Fans Schematic
Figure 004



Cabin Fans Schematic
Figure 005

R

1. Operational Test

A. Reason for the Job
To test if any Cabin Fan MFA lights are activated.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure
(1)Job Set-Up
(a)Connect electrical ground power unit and energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Make certain that electronics racks ventilation is correct.
(c)Make certain that the following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILATION-CABIN FANS CTL	14HG	H59
132VU	LIGHTING-MAINT PANEL-ANN & MFA	1WB	L78
132VU	LIGHTING-MAINT PANEL-ANN & MFA	22WB	L79
132VU	LIGHTING-INTERIOR LT-ANN LT TEST MAN	1LP	L80
132VU	LIGHTING-INTERIOR LT-ANN LT TEST MAN	2LP	L81
132VU	LIGHTING-INTERIOR LT-ANN LT TEST MAN	149LP	L82
132VU	LIGHTING-INTERIOR LT-ANN LT TEST AUTO	153LP	M83

(2)Test FANS MONITOR MFA lights.

ACTION	RESULT
1. On panel 472VU: - place ANN LT switch in READ position. - record all MFA lights that come on. - place ANN LT switch in TEST position. - place ANN LT switch in READ position.	On panels 470VU, 471VU and 472VU: - any MFA lights having stored fault signal come on. - all annunciator and MFA lights come on. - Annunciator lights go off - memorized fault annunciators come on again.
2. On panels 470VU, 471VU and 472VU: - press MFA RESET pushbuttons. NOTE : Some MFA lights may come on again indicating the status of the system	On panels 470VU, 471VU and 472VU: - all lights go off.
3. On panel 472VU: - place ANN LT switch in OFF position.	On panels 470VU, 471VU and 472VU: - all annunciator and MFA lights go off, without exception.

(3)Close-Up
(a)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(b)De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

1. Equipment and Materials

ITEM	DESIGNATION
A.	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz
B.	Cotter Pins

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 25-23-11, P. Block 401	Ceiling Panels
- 21-22-12, P. Block 201	Air Filter

2. Procedure

(Ref. Fig. 401)

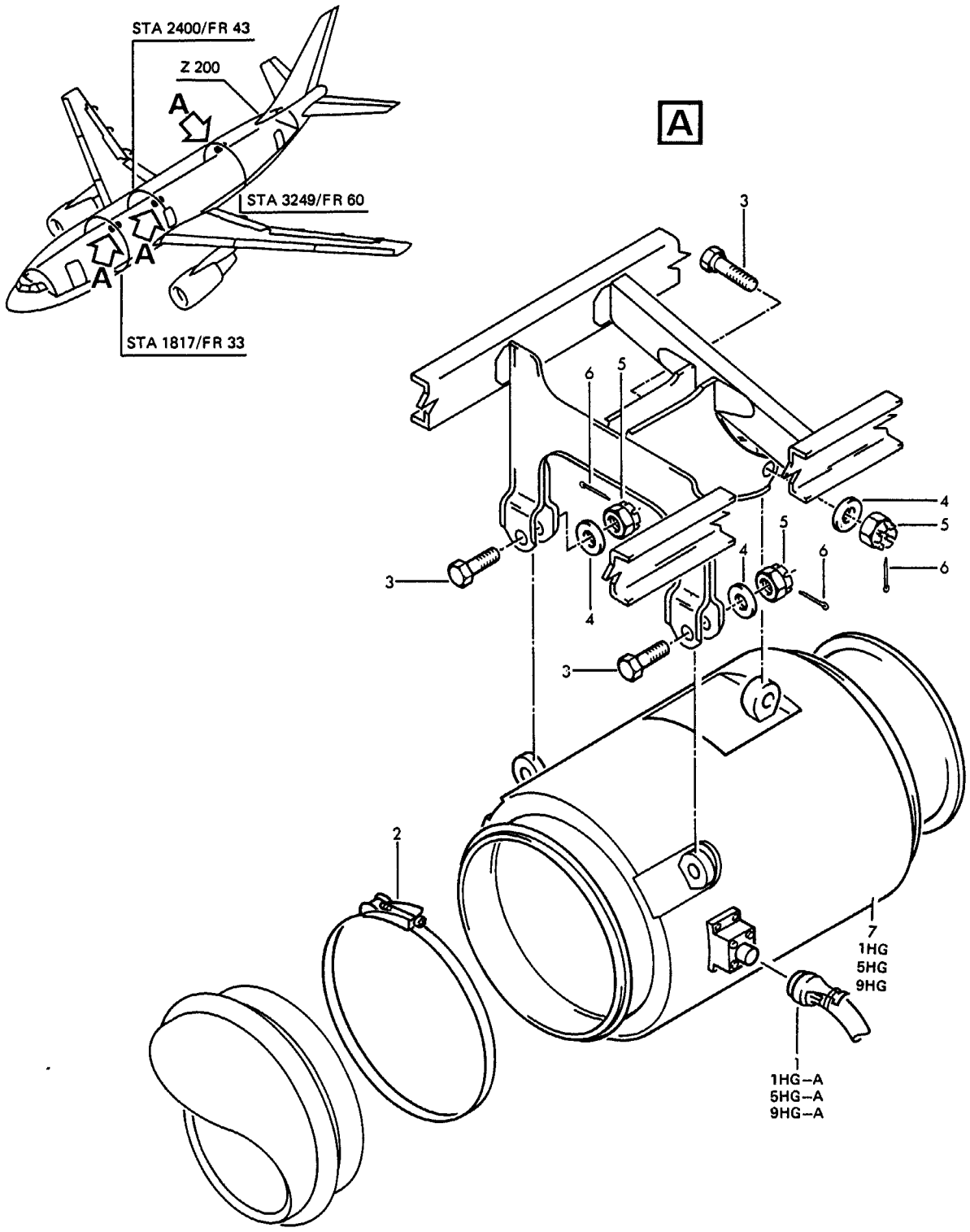
A. Job Set-Up

(1)Remove ceiling panels as required (Ref. 25-23-11, P. Block 401).

(2)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILATION/CABIN FANS/FWD	4HG	F60
131VU	VENTILATION/CABIN FANS/MID	8HG	F63
131VU	VENTILATION/CABIN FAN/AFT	12HG	G60
131VU	VENTILATION/CABIN FANS/CTL	14HG	H59

(3)On VENT panel 438VU, make certain that CABIN FANS pushbutton switch is released OFF.



BM6 21 22 11 4 AA M 0-23

Typical Cabin Fan
Figure 401

B. Removal
(1)Remove air filter (Ref. 21-22-12, P. Block 201).
(2)Disconnect and cap electrical connector (1).
(3)Release clamp (2).
(4)Remove and discard cotter pins (6).
(5)Remove nuts (5), washers (4), bolts (3) and fan (7).

C. Installation
(1)Position fan (7), install bolts (3), washers (4), nuts (5).
(2)Safety nuts (5) with cotter pins (6).
(3)Install clamp (2).
(4)Remove protective cap and connect electrical connector (1).
(5)Install air filter (Ref. 21-22-12, P. Block 201).

D. Test
(1)Remove safety clips and tags, and close circuit breakers 4HG, 8HG, 12HG and 14HG.
(2)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)Test operation of fans:

ACTION	RESULT
1. On VENT panel 438VU: - Make certain that CABIN FANS pushbutton switch is released OFF.	On VENT panel 438VU: - OFF/R legend is on.
- Press CABIN FANS pushbutton switch.	- OFF/R legend goes off. In Passenger Compartment: - FWD, MID and AFT cabin fan is operating.
2. In Passenger Compartment: - Check duct connections for leaks.	- Leaks are not permissible.

E. Close-Up
(1)Make certain that working area is clean, and clear of tools and miscellaneous equipment.
(2)Install ceiling panels (Ref. 25-23-11, P. Block 401).
(3)De-energize the aircraft electrical network and disconnect electrical ground power unit (24-41-00, P. Block 301).

AIR FILTER - MAINTENANCE PRACTICES

R **WARNING** : PUT ON GLOVES, A COVERALL WITH A HOOD, GOGGLES AND A PARTICULATE
R RESPIRATOR BEFORE YOU TOUCH THE FILTER. THE FILTER REMOVES SMALL
R PARTICLES (SMOKE, DUST, LINT, FIBERS, POLLEN) AND INFECTIOUS
R MATERIALS (BACTERIA, VIRUSES, MOLD SPORES, FUNGI) FROM THE AIR. THESE
R MATERIALS CAN CAUSE ILLNESS.

R **WARNING** : DO NOT LET THE FILTER TOUCH YOUR SKIN. DO NOT SHAKE OR HIT THE
R FILTER. DO NOT USE COMPRESSED AIR TO CLEAN THE FILTER OR FILTER
R HOUSING. THIS CAN CAUSE INFECTIOUS MATERIAL TO BECOME AIRBORNE.
R DISCARD THE FILTER IN A PLASTIC DISPOSAL BAG.
R IF YOU DO NOT OBEY THESE INSTRUCTIONS, INFECTIOUS MATERIAL FROM THE
R FILTER CAN CAUSE ILLNESS.

R **WARNING** : PUT ALL AIR FILTERS THAT YOU REMOVE FROM THE AIRCRAFT INTO PLASTIC
R DISPOSAL BAGS. AIR FILTERS CAN CONTAIN INFECTIOUS MATERIALS WHICH CAN
R CAUSE ILLNESS. OBEY AIRLINE POLICY AND LOCAL HEALTH DEPARTMENT AND
R LAW ENFORCEMENT REGULATIONS FOR DISPOSAL OF INFECTIOUS MATERIALS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz
B.	Torque Wrench, up to 1.0 m.daN (7.4 lbf.ft.)
C. QR1041	Repair Kit for Filter Assy P/N QB0276 (Ref. TDS 21-20-14)

**ON A/C ALL

Post SB 21-2057 For A/C ALL

C. Not applicable

**ON A/C ALL

D.	Soft Bristle Brush
E.	Vacuum Cleaner with Adapters
F.	Air Filter Element
G. Material No. 11-001	Cleaning Agents (Ref. 20-31-00)
H. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control

- 25-23-11, P. Block 401 Ceiling Panels

2. Procedure
(Ref. Fig. 201)

**ON A/C ALL

Post SB 21-2057 For A/C ALL

(Ref. Fig. 202)

**ON A/C ALL

A. Job Set-Up
(1)Remove ceiling panels as required (Ref. 25-23-11, P. Block 401).
(2)On VENT panel 438VU, make certain that CABIN FANS pushbutton switch is released OFF.
(3)Protect area below filter housing (7).

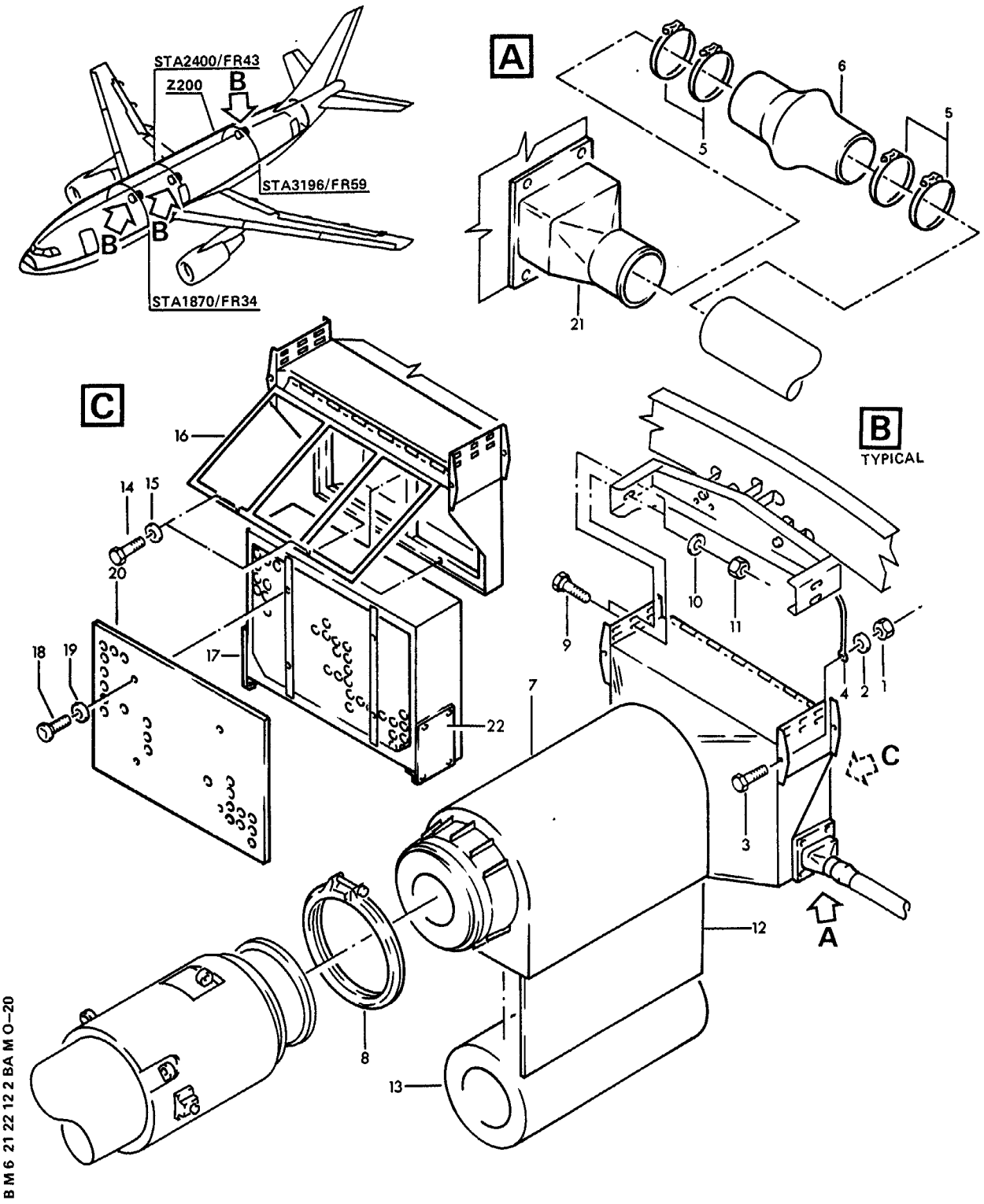
B. Servicing of Filter Element and Centrisep Assembly
(1)Replacement of filter element (13).
(a)Release fasteners and open access door (12).
(b)Pull locking lever downwards and remove filter element (13).
(c)Inspect filter element (13) for contamination. Discard if necessary.
(d)Install replacement filter element (13) and raise locking lever.
(e)Close access door (12) and secure fasteners.
(2)Replacement of centrisep assy (17).
(a)Release clamps (5) and remove sleeve (6) from centrisep assy (17).
(b)Remove bolts (14) and washers (15).
(c)Open trap door (16) and remove centrisep assy (17).
(d)Position centrisep assy (17).
NOTE : Replace scavenge outlet (21) if necessary.
(e)Close trap door (16).
(f)Install bolts (14) and washers (15).
(g)Position sleeve (6) and install clamps (5).

**ON A/C ALL

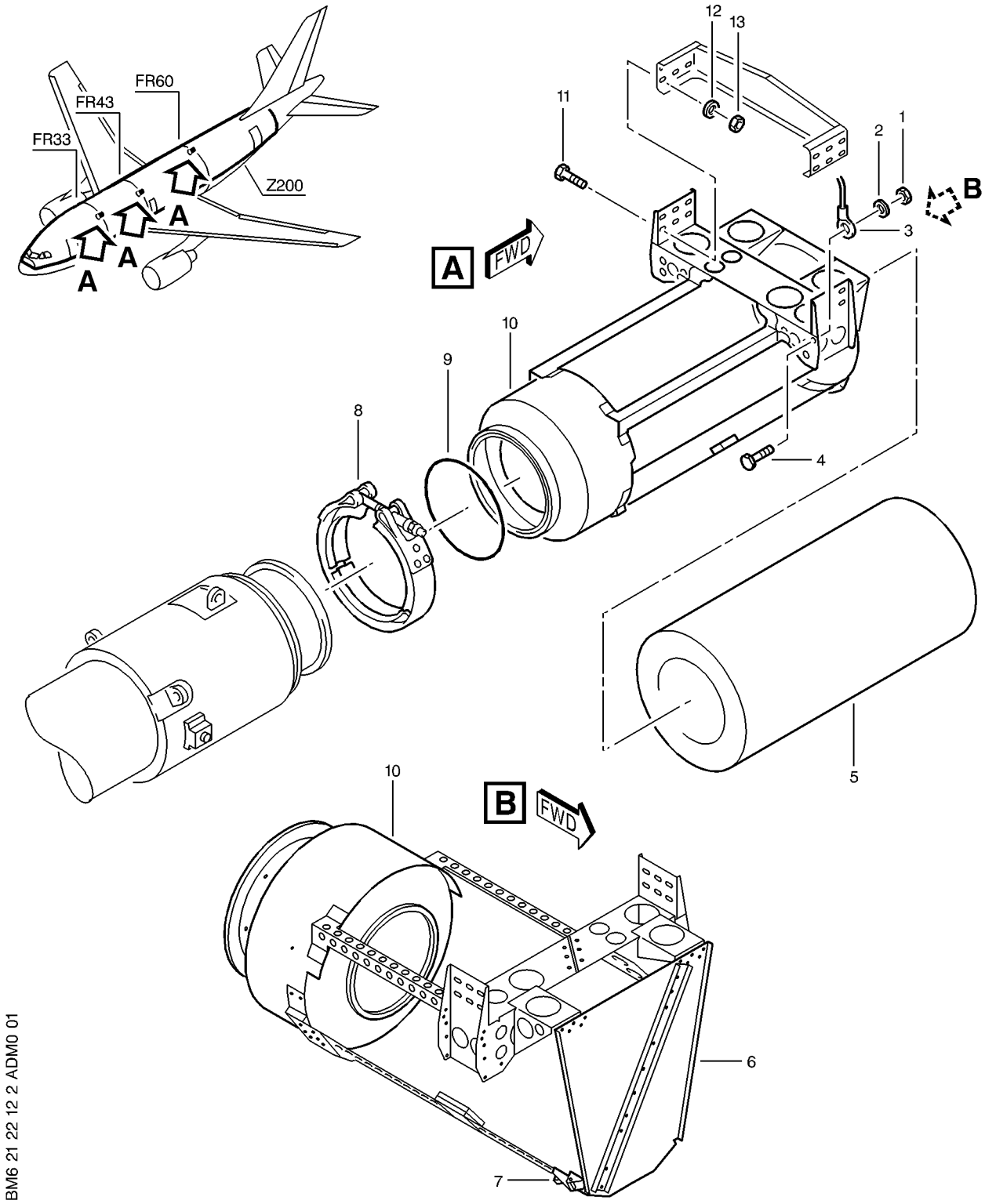
Post SB 21-2057 For A/C ALL

A. Job Set-Up
(1)Remove the ceiling panels as required (Ref. 25-23-11, P. Block 401).
(2)On the VENT panel 438VU, make certain that the CABIN FANS pushbutton switch is released OFF.
(3)Protect the area below the filter housing (10).

B. Servicing of the Filter Element
(1)Replacement of the filter element (5).



Typical Air Filter
Figure 201



Typical Air Filter
Figure 202

(a)Unlock the latch (7) and open the access door (6).
(b)Remove the filter element (5).
(c)Inspect the filter element (5) for contamination. Discard if necessary.
(d)Install the filter element (5).
(e)Close the access door (6) and lock the latch (7).

**ON A/C ALL

C. Removal of Filter Assembly
(1)Remove nut (1), washer (2), screw (3), and disconnect bonding strap (4).
(2)Release clamps (5) and free sleeve (6) from air filter housing (7).
(3)Release clamp (8).
(4)Remove nuts (11), washers (10), screws (9) and air filter housing (7).

D. Inspection of Filter Assembly
(1)Visually inspect exterior of air filter housing for cracks and damage. Pay particular attention to attachment points.
(2)Inspect inertial separator vortex tubes. Any tubes found loose or damaged should be repaired using repair kit QR1041.
NOTE : If 6 or more tubes are damaged, filter assembly must be removed and returned to manufacturer.
(3)Inspect interior of filter housing for cleanliness.

**ON A/C ALL

Post SB 21-2057 For A/C ALL

C. Removal of Filter Assembly
(1)Remove nut (1), washer (2), screw (4), and disconnect bonding strap (3).
(2)Release clamp (8).
(3)Remove nuts (13), washers (12), screws (11) and air filter housing (10).

D. Inspection of Filter Assembly
(1)Visually inspect exterior of air filter housing for cracks and damage. Pay particular attention to attachment points.
(2)Inspect interior of filter housing for cleanliness.
(3)Inspect packing (9) for condition. Replace packing (9) if necessary.

**ON A/C ALL

E. Cleaning of Centrisep Assembly
(1)Cleaning of Centrisep Assy
NOTE : Two cleaning procedures (wet, dry) are available; the dry cleaning procedure is to be performed when the wet cleaning procedure is not practicable.
Both procedures may be performed with filter housing (7) in situ.
(a)Wet Cleaning Procedure

1 Remove filter element (13) (Ref. Para. B(1)).
2 Remove centrisep assy (17) (Ref. Para. B(2)).
3 Removal of inlet plate (20).
- Remove screws (18) and washers (19).
- Carefully lift centrisep inlet plate (20) from frame.

WARNING : OBEY THE MANUFACTURER'S INSTRUCTIONS WHEN YOU USE THIS/THESE MATERIAL/S.
USE PROTECTIVE CLOTHING, RUBBER GLOVES, GOOGLES AND A MASK.

4 Submerge centrisep assy (17) in solvent (Mat. No. 11-002) for approximately 15 minutes.
5 Clean all vortex generators with water/detergent wash solution (Mat. No. 11-001) at 40° to 50° C (104° to 122° F).
6 Rinse with clean water.
7 Using compressed air, blow dry all vortex generators and inside of Centrisep housing.

NOTE : Position centrisep housing so that scavenge outlet (21) is at lowest point for draining.

8 Install centrisep inlet plate (20) to centrisep frame ensuring correct positioning of all vortex tubes, install screws (18) and washers (19).
9 Install centrisep assy (17) to air filter housing (7) (Ref. Para. B.(2)).
10 Install filter element (13) (Ref. Para. B (1)).

(b)Dry Cleaning Procedure

1 Release clamps (5) and disconnect sleeve (6) from scavenge outlet (21).
2 Remove centrisep assy (17) from housing.
3 Using a powerful vacuum cleaner with appropriate adapter, clean each vortex generator tube.
4 Loosen and extract dust with soft, long-haired brush.
5 Using an adapter to provide a sealed fit, connect vacuum cleaner to scavenge outlet (21).
6 Operate vacuum cleaner.
7 Use compressed air to blow each vortex generator tube clean. Starting at top of vertical row at end opposite scavenge outlet, clean each vertical row in sequence from top to bottom.
8 Disconnect vacuum cleaner and adapter.
9 Install centrisep assy (17) to air filter housing (7) (Ref. Para. B.(2)).
10 Inspect filter assembly and install filter element (13) (Ref. Para. B.(1)).
11 Position sleeve (6) and install clamps (5).

NOTE : Ends of sleeve must be within color markings.

12 Wipe filter housing external surfaces clean.
13 Check connections for leaks (Ref. Para. G.).

**ON A/C ALL

Post SB 21-2057 For A/C ALL

E. Cleaning of Filter Assembly
(1)Remove filter assembly (10) (Ref. Para. C. (1)).
(2)Remove filter element (5) (Ref. Para. B. (1)).
(3)Remove dust using vacuum cleaner and soft, long-haired brush.
(4)Inspect filter assembly (10) and install filter element (5) (Ref. Para. B. (1)).
(5)Wipe filter housing external surfaces clean.
(6)Install filter assembly (10) (Ref. Para. F. (1)).
(7)Press **CABIN FANS** pushbutton switch on and check connections for leaks.

**ON A/C ALL

(2)Cleaning of Vent Tube
(a)Release clamps (5) and disconnect sleeve (6) from scavange outlet (21).
(b)Clean inside of vent tube and venturi, using a bottle cleaning brush.
(c)Position sleeve (6) and install clamps (5).
NOTE : Ends of sleeve must be within color markings.

F. Installation of Filter Assembly
(1)Position air filter housing (7) and install screws (9), washers (10) and nuts (11).
(2)Install clamp (8) and **TORQUE** to between 0.51 m.daN (3.76 lbf.ft.) and 0.56 m.daN (4.2 lbf.ft.).
(3)Position sleeve (6) and install clamps (5).
NOTE : The ends of sleeve (6) must be within color markings.
(4)Install bonding strap (4) with screw (3), washer (2) and nut (1).

G. Test
(1)Connect electrical ground power unit and energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that electronics racks ventilation is correct.
(3)On **VENT** panel 438VU, press **CABIN FANS** pushbutton switch on and check fan/filter and scavenge outlet connections for leaks. Leaks are not permissible.

H. Close-Up
(1)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(2)Install ceiling panels (Ref. 25-23-11, P. Block 401).
(3)De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

**ON A/C ALL

Post SB 21-2057 For A/C ALL

F. Installation of Filter Assembly

(1)Inspect filter assembly (10) and packing (9) for condition.
(2)Position air filter assembly (10) and install screws (11), washers (12) and nuts (13).

NOTE : If you install a new filter assembly, remove the filter dummy element before you install the filter element.

(2)Install clamp (8) and TORQUE to between 0.51 m.daN (3.76 lbf.ft.) and 0.56 m.daN (4.2 lbf.ft.).
(3)Install bonding strap (3) with screw (4), washer (2) and nut (1).

G. Test
(1)Connect electrical ground power unit and energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that electronics racks ventilation is correct.
(3)On VENT panel 438VU, press CABIN FANS pushbutton switch on and check fan/filter connection for leaks. Leaks are not permitted.

H. Close-Up
(1)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(2)Install ceiling panels (Ref. 25-23-11, P. Block 401).
(3)De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

R WARNING : PUT ON GLOVES, A COVERALL WITH A HOOD, GOGGLES AND A PARTICULATE
R RESPIRATOR BEFORE YOU TOUCH THE FILTER. THE FILTER REMOVES SMALL
R PARTICLES (SMOKE, DUST, LINT, FIBERS, POLLEN) AND INFECTIOUS
R MATERIALS (BACTERIA, VIRUSES, MOLD SPORES, FUNGI) FROM THE AIR. THESE
R MATERIALS CAN CAUSE ILLNESS.

R WARNING : DO NOT LET THE FILTER TOUCH YOUR SKIN. DO NOT SHAKE OR HIT THE
R FILTER. DO NOT USE COMPRESSED AIR TO CLEAN THE FILTER OR FILTER
R HOUSING. THIS CAN CAUSE INFECTIOUS MATERIAL TO BECOME AIRBORNE.
R DISCARD THE FILTER IN A PLASTIC DISPOSAL BAG.
R IF YOU DO NOT OBEY THESE INSTRUCTIONS, INFECTIOUS MATERIAL FROM THE
R FILTER CAN CAUSE ILLNESS.

R WARNING : PUT ALL AIR FILTERS THAT YOU REMOVE FROM THE AIRCRAFT INTO PLASTIC
R DISPOSAL BAGS. AIR FILTERS CAN CONTAIN INFECTIOUS MATERIALS WHICH CAN
R CAUSE ILLNESS. OBEY AIRLINE POLICY AND LOCAL HEALTH DEPARTMENT AND
R LAW ENFORCEMENT REGULATIONS FOR DISPOSAL OF INFECTIOUS MATERIALS.

1. Reason for the Job
Inspection of filter element of FWD, MID and AFT recirculation system.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Air Filter Element
B.	Vacuum Cleaner with Adapters
C. Material No. 11-001	Cleaning Agents (Ref. 20-31-00)
D. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

- 25-23-11, P. Block 401	Ceiling Panels - Removal / Installation
- 25-22-12, P. Block 201	Air Filter - Maintenance Practices

3. Procedure

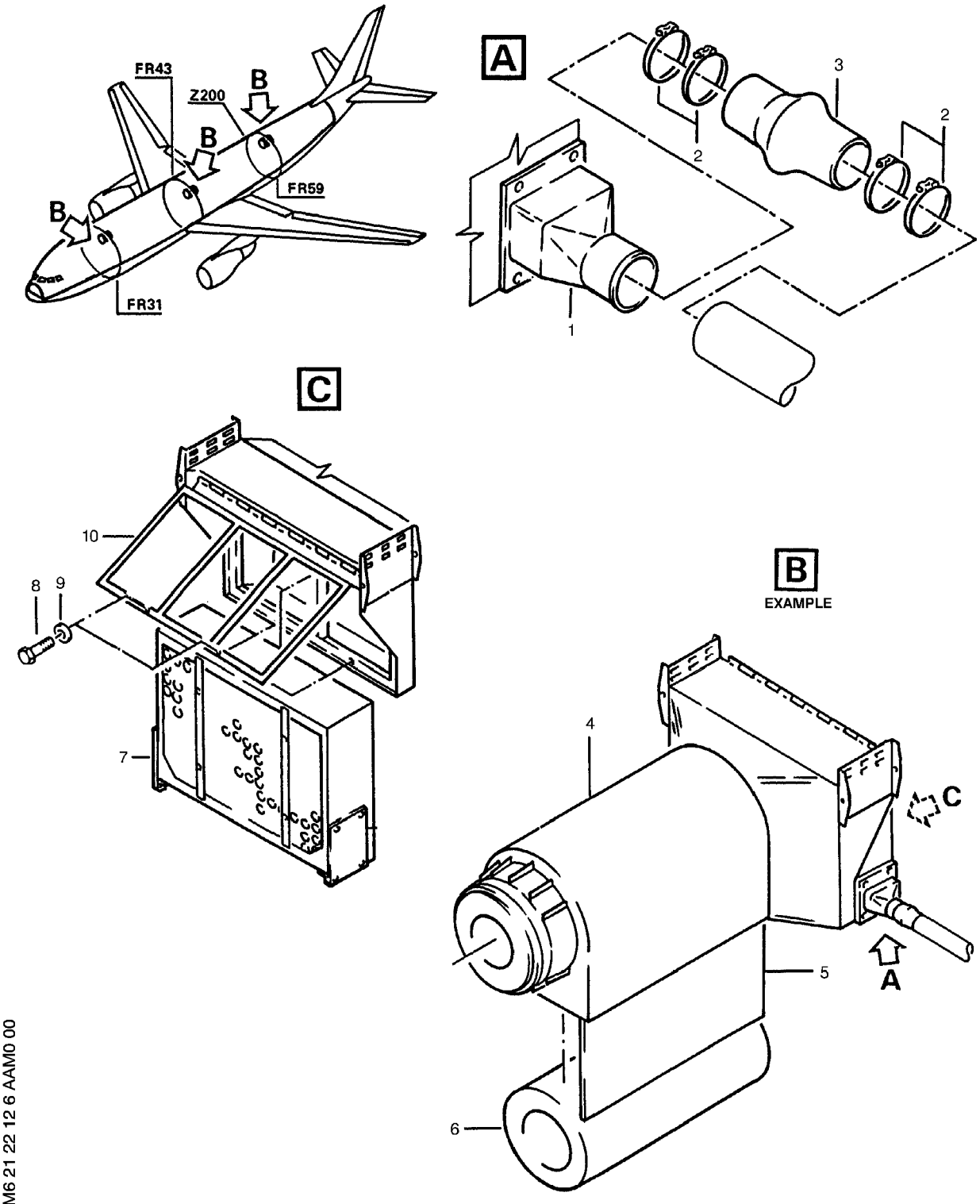
(Ref. Fig. 601)

**ON A/C ALL

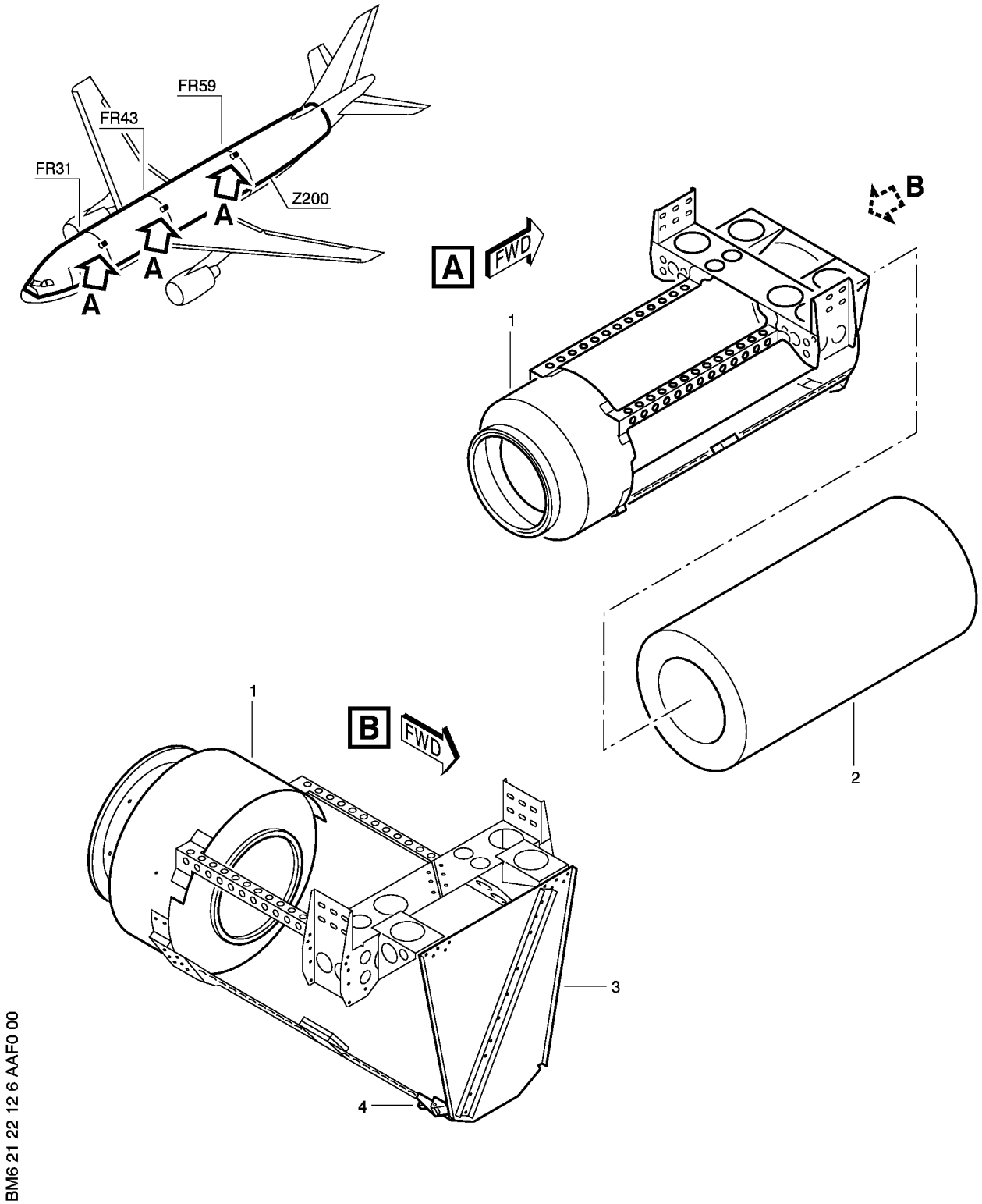
Post SB 21-2057 For A/C ALL

(Ref. Fig. 602)

**ON A/C ALL



Typical Air Filter
Figure 601



Typical Air Filter
Figure 602

A. Job Set-Up
(1)Remove ceiling panels as required (Ref. 25-23-11, P. Block 401).
(2)On VENT panel 438VU, make certain that CABIN FANS pushbutton switch is released OFF.
(3)Protect area below filter housing (4).

**ON A/C ALL

Post SB 21-2057 For A/C ALL

A. Job Set-Up
(1)Remove ceiling panels as required (Ref. 25-23-11, P. Block 401)
(2)On VENT panel 438VU, make certain that CABIN FANS pushbutton switch is released OFF.
(3)Protect area below filter housing (1).

**ON A/C ALL

B. Removal
(1)Removal of filter element (6).
(a)Release fasteners and open access door (5).
(b)Pull locking lever downwards and remove filter element (6).
(2)Removal of centrisep assembly (7).
(a)Release clamps (2) and remove sleeve (3) from centrisep asssy (7).
(b)Remove bolts (8) and washers (9).
(c)Open trap door (10) and remove centrisep assy (7).

**ON A/C ALL

Post SB 21-2057 For A/C ALL

B. Removal
(1)Removal of filter element (2).
(a)Unlock the latch (4) and open the access door (3).
(b)Remove the filter element (2).

**ON A/C ALL

C. Inspection
(1)Inspection of filter element (6).
(a)Inspect filter element (6) for cleanness. Discard if necessary.
(2)Inspection of Centrisep Assembly (7).
(a)Inspect centrisep assembly (7) for cleanness. Discard if necessary.
(b)For cleaning of centrisep assy (Ref. 21-22-12, P. Block 201).

**ON A/C ALL

Post SB 21-2057 For A/C ALL

C. Inspection
(1)Inspection of filter element (2).
(a)Inspect filter element (2) for contamination. Discard if necessary.

**ON A/C ALL

D. Installation
(1)Installation of filter element (6).
(a)Install replacement filter element (6) and raise locking lever.
(b)Close access door (5) and secure fasteners.
(2)Installation of Centrisep Assembly (7).
(a)Position centrisep assy (7).

NOTE : Replace scavenge outlet (1) if necessary.

(b)Close trap door (10).
(c)Install bolts (8) and washers (9).
(d)Position sleeve (3) and install clamps (2).

**ON A/C ALL

Post SB 21-2057 For A/C ALL

D. Installation
(1)Installation of filter element (2).
(a)Install replacement filter element (2) and raise locking lever.
(b)Close access door (3) and secure fasteners.

**ON A/C ALL

E. Test
(1)Connect electrical ground power unit and energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that electronics racks ventilation is correct.
(3)On VENT panel 438VU, press CABIN FANS pushbutton switch and check fan/filter and scavenge outlet connections for leaks. Leaks are not permissible.

**ON A/C ALL

Post SB 21-2057 For A/C ALL

E. Test
(1)Connect electrical ground power unit and energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that electronics racks ventilation is correct.

(3)On VENT panel 438VU, press CABIN FANS pushbutton switch and check fan/filter connection for leaks. Leaks are not permitted.

**ON A/C ALL

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Install ceiling panels (Ref. 25-23-11, P. Block 401).
(3)De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

**ON A/C ALL

Post SB 21-2057 For A/C ALL

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Install ceiling panels (Ref. 25-23-11, P. Block 401).
(3)De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

CHECK VALVES 21A406, 21B406, 21C406 - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Torque Wrench, up to 1.5 m.daN (11 lb.ft.)
B.	Electrical Ground Power Unit-3-Phase, 115/200 V, 400 Hz

Referenced Procedure

- 24-41-00, P. Block 301	AC External Power Control
- 25-23-11, P. Block 401	Ceiling Panels

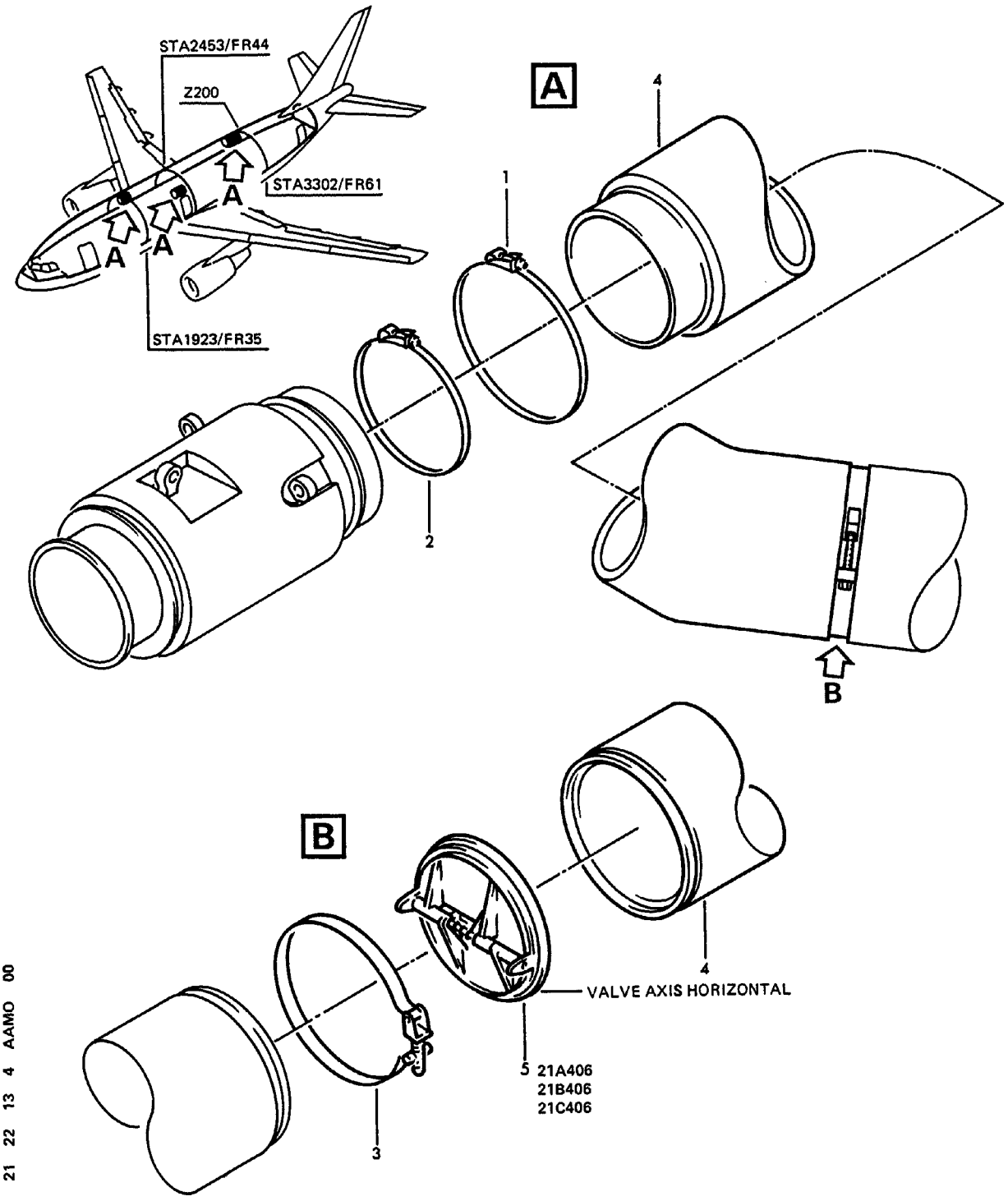
2. Procedure

(Ref. Fig. 401)

A. Job Set-Up
  (1)Remove ceiling panels as required (Ref. 25-23-11, P. Block 401).
  (2)On **VENT** panel **438VU**, make certain that **CABIN FANS** pushbutton switch is released.

B. Removal
  (1)Release clamps (1, 2, 3) and remove duct (4).
  (2)Remove check valve (5).

C. Installation
  (1)Position check valve (5), with arrow on valve pointing in direction of airflow.
  NOTE : Check valve axis must be horizontal.
  (2)Position duct (4) and install clamps (1, 2, 3).
  (3)**TORQUE** clamp (3) to between 0.9 m.daN (6.6 lbf.ft.) and 1.1 m.daN (8.1 lbf.ft.).



Check Valve
Figure 401

D. Test
(1)Connect electrical ground power unit and energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that electronics racks ventilation is correct.
(3)On panel 438VU, press **CABIN FANS** pushbutton switch in and check duct/check valve connections for leaks. Leaks are not permissible.

E. Close-Up
(1)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(2)Install ceiling panels (Ref. 25-23-11, P. Block 401).
(3)De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

ELECTRONICS RACKS AIR EXTRACTION - DESCRIPTION AND OPERATION

1. General

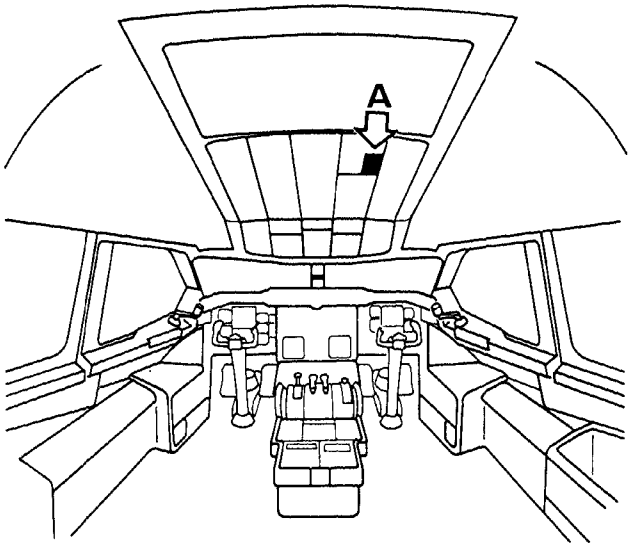
Conditioning air discharged from the flight compartment and air ventilating the electronics racks is drawn across or near the equipment and is evacuated :

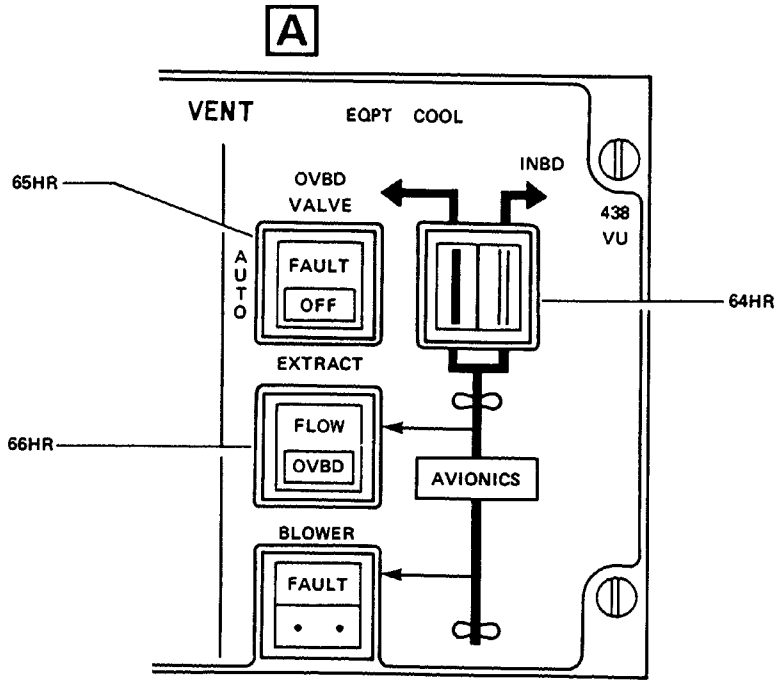
- on the ground, directly outside of the aircraft
- in flight, under the forward cargo compartment floor and then overboard through the cabin pressure outflow valves which are controlled by the cabin pressure control system.

2. Component Location

(Ref. Fig. 001)
(Ref. Fig. 002)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
64HR	ANNUNCIATOR - VENT/EQPT COOL/OVBD VALVE/INBD	438VU	212		21-23-00
65HR	P/BSW - VENT/EQPT COOL/OVBD VALVE	438VU	212		21-23-00
66HR	P/BSW - VENT/EQPT COOL/EXTRACT	438VU	212		21-23-00
72HR	DETECTOR - AIRFLOW, AVIONICS EXTRACT FAN		133	134AR	21-23-14
73HR	FAN - EXTRACT, AVIONICS		133	134AR	21-23-11
74HR	VALVE - INBOARD EXTRACT		133	131QF	21-23-12
75HR	VALVE - OVBD EXTRACT		133		21-23-13





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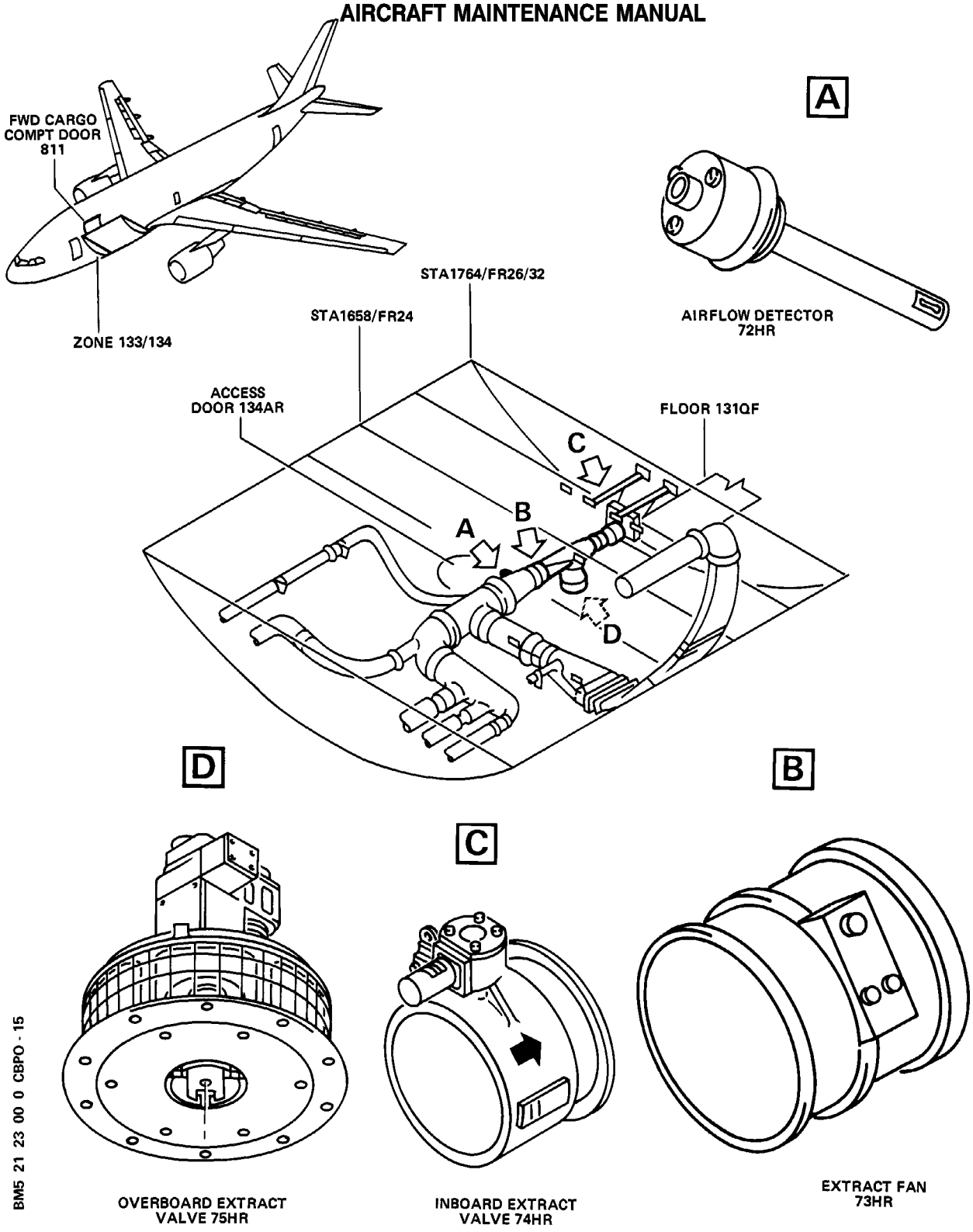
Control and Indicating - Location
Figure 001



Electronics Racks Air Extraction - Component Location
Figure 002

3. Description

A. Air Extraction

R **ON A/C 101-200,

(Ref. Fig. 003)

R **ON A/C 001-100,

(Ref. Fig. 004)

R **ON A/C ALL

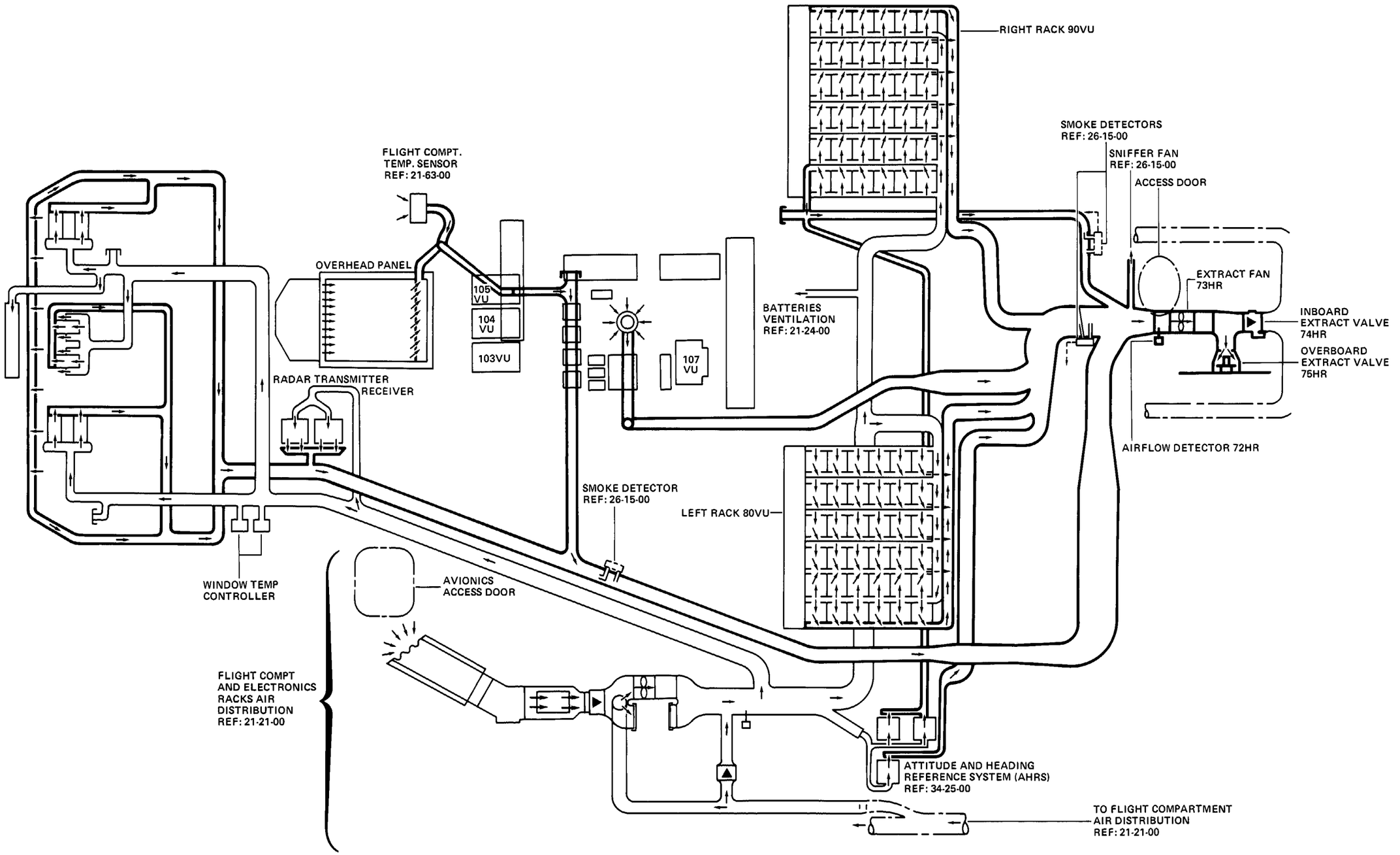
Air is extracted by extract fan 73HR.
The extracted air is entirely ducted from the ventilated zones or equipment towards either overboard extract valve 75HR or inboard extract valve 74HR.
In the event of failure of the extract fan or the inboard extract valve, the overboard extract valve can be partially opened thus ensuring air extraction by differential pressure (ΔP : cabin pressure/exterior pressure).
To avoid any risk of damage to the extraction system, the main extraction manifolds are located under the avionics compartment floor. The manifolds are equipped with smoke detectors (Ref. 26-15-00).

B. Control and Indicating
(Ref. Fig. 005)
(Ref. Fig. 006)

C. Ground Warnings
(Ref. Fig. 007)

D. Control Warnings
(1)Low flow warning
Illumination of FLOW legend on EXTRACT pushbutton switch is accompanied by :
- activation of the single chime aural warning
- illumination of MASTER CAUTION lights on CAPT and F/O main instrument panels 3VU and 5VU.
- a message display on the left ECAM display unit (Ref. 31-51-00).

(2)Overboard extract valve position fault warning
Illumination of the FAULT legend on the OVBD VALVE pushbutton switch is accompanied by :
- activation of the single chime aural warning
- illumination of MASTER CAUTION lights on CAPT and F/O main instrument panels 3VU and 5VU.
- display of a message on the left ECAM display unit and of an indication on the CAB PRESS page on the right ECAM display unit.



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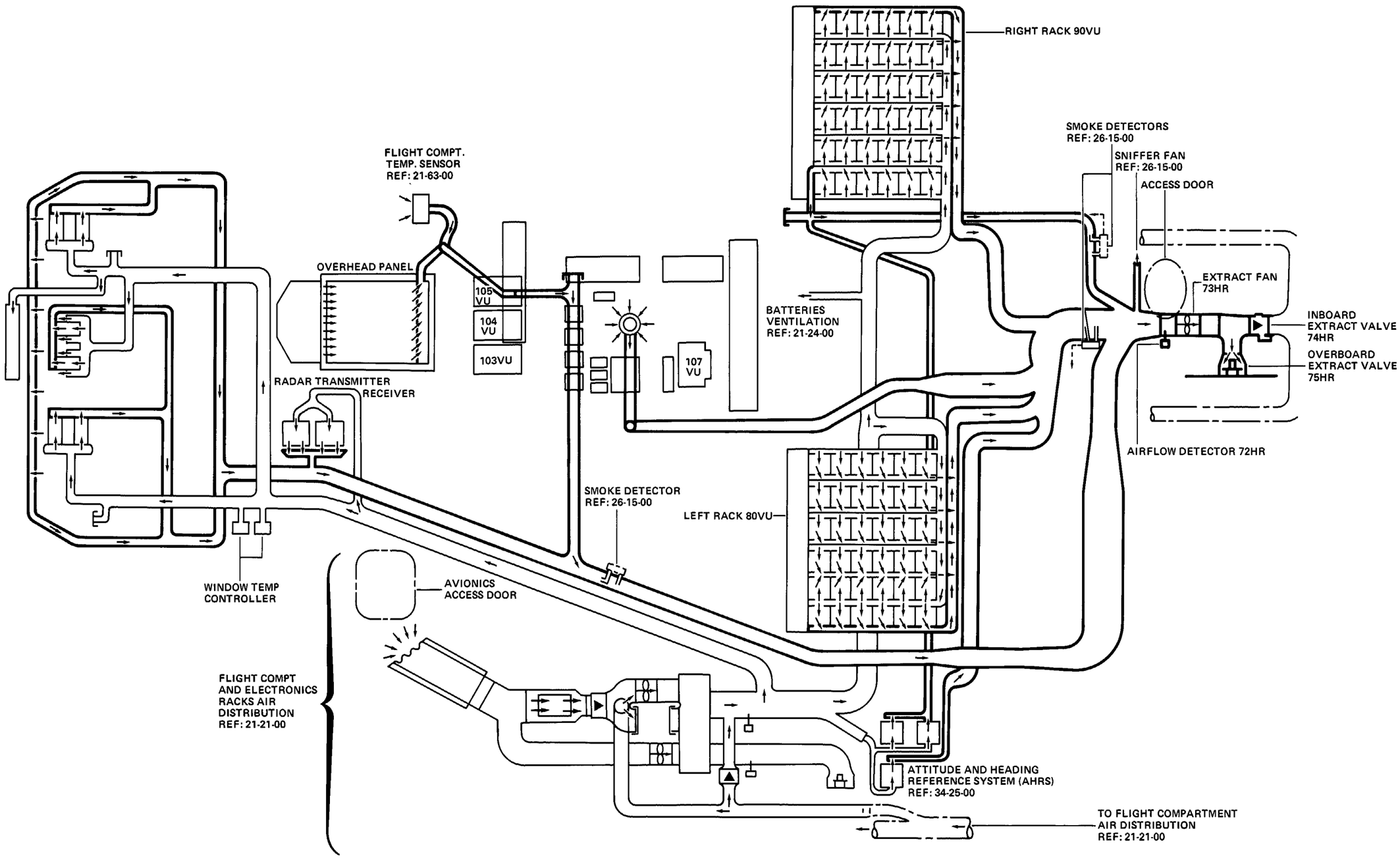
Electronics Racks Air Extraction - Airflow Diagram
Figure 003



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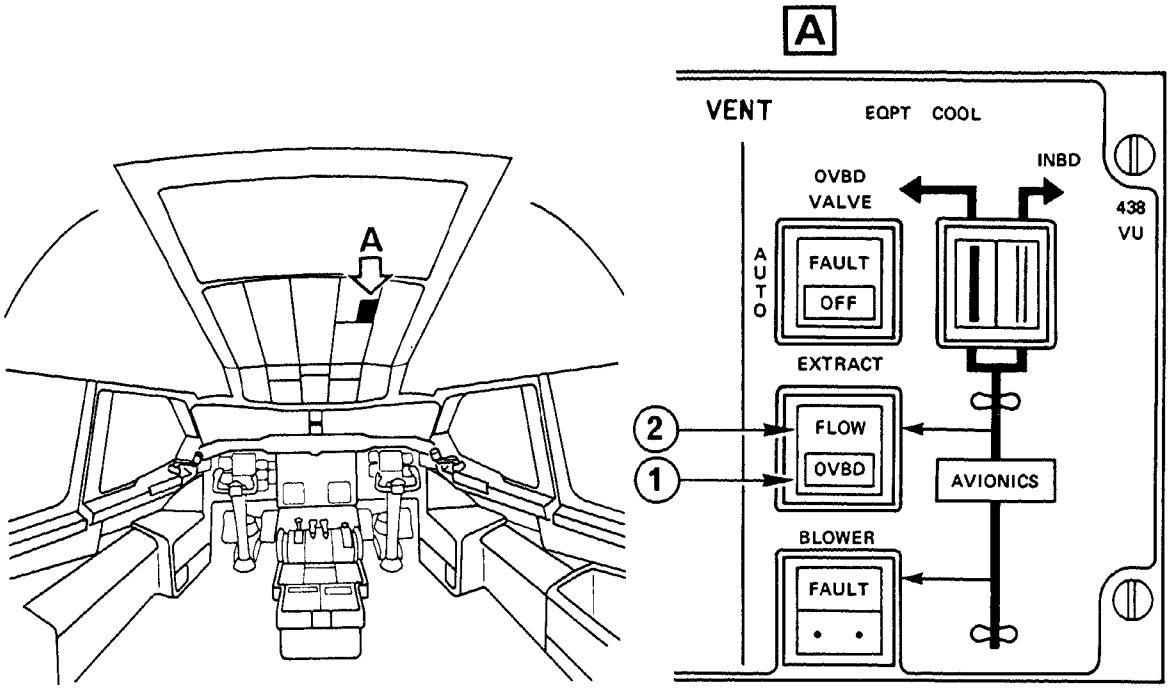
Electronics Racks Air Extraction - Airflow Diagram
Figure 004

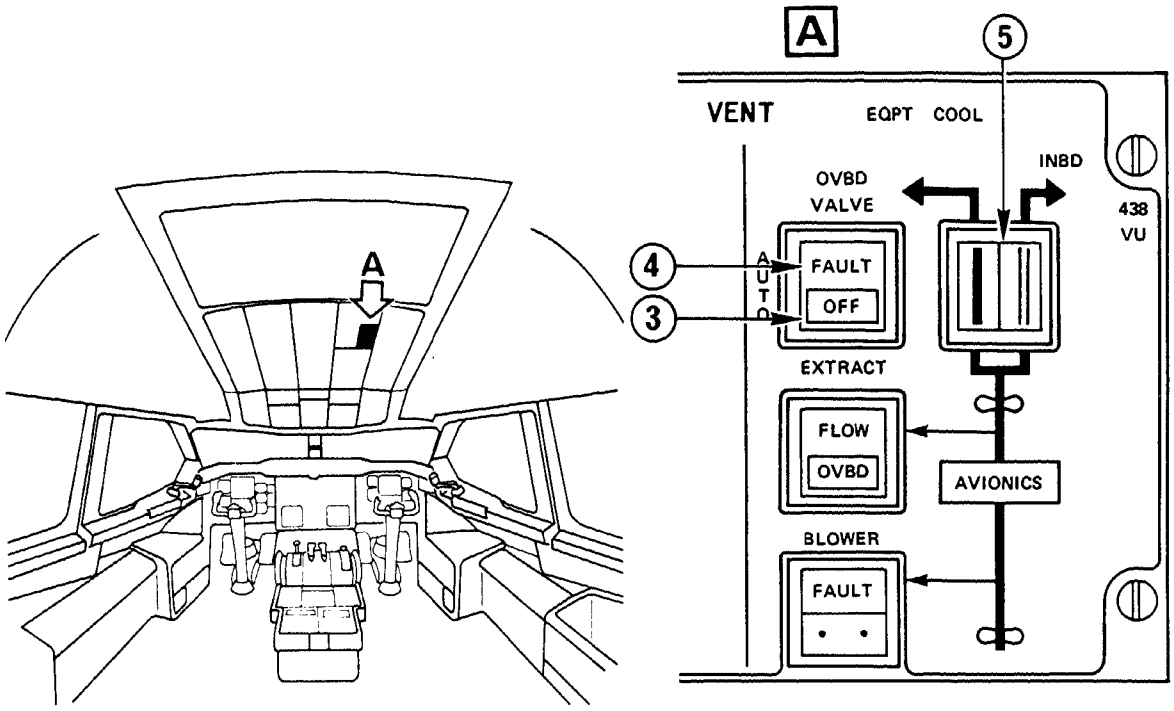


- 1. EXTRACT PUSHBUTTON SWITCH 66HR SERVES TO SELECT THE AIR EXTRACTION MODE (BY EXTRACT FAN 73HR OR CABIN DIFFERENTIAL PRESSURE) (IF OVBD VALVE PUSHBUTTON SWITCH 65HR IS PRESSED (IN) (AUTO).
  - PUSHBUTTON SWITCH PRESSED (IN) : THE EXTRACT FAN OPERATES CONTINUOUSLY; THE OVERBOARD EXTRACT VALVE OR THE INBOARD EXTRACT VALVE OPEN DEPENDING ON THE AIRCRAFT CONFIGURATION.
  - PUSHBUTTON SWITCH RELEASED (OUT) (OVBD LEGEND COMES ON WHITE) : THE OVERBOARD EXTRACT VALVE OPENS PARTIALLY ; THE EXTRACT FAN OPERATES AT LOW SPEED. THIS EXTRACTION MODE IS USED IF THE NORMAL EXTRACTION MODE FAILS OR IF SMOKE IS DETECTED IN FLIGHT.

- 2. AMBER FLOW LEGEND ON EXTRACT PUSHBUTTON SWITCH 66HR
  - LEGEND COMES ON TO INDICATE INSUFFICIENT EXTRACTION AIRFLOW (FAILURE OF THE EXTRACT FAN OR THE INBOARD EXTRACT VALVE OR THE OVERBOARD EXTRACT VALVE IN CLOSED POSITION).

BM5 21 23 00 0 ACTO 13

Overhead Panel - VENT Panel 438VU (EXTRACT)
Figure 005



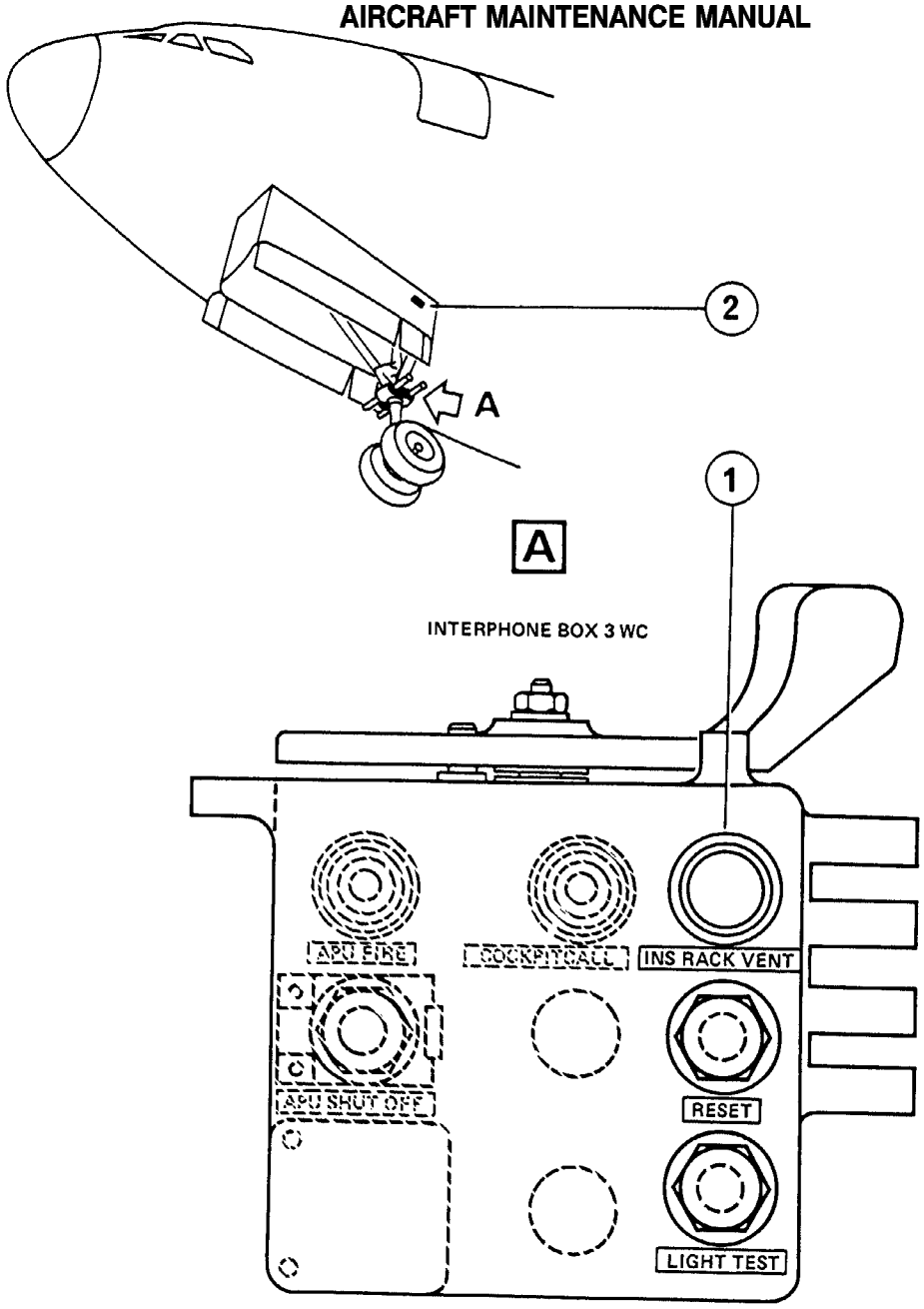
- 3. OVBD VALVE PUSHBUTTON SWITCH SERVES TO CONTROL THE OVERBOARD EXTRACT VALVE.
  - PUSHBUTTON SWITCH PRESSED (IN) (AUTO) : THE OVERBOARD EXTRACT VALVE IS AUTOMATICALLY CONTROLLED TO THE OPEN OR CLOSED POSITION, DEPENDING ON THE AIRCRAFT CONFIGURATION.
  - PUSHBUTTON SWITCH RELEASED (OUT) (OFF LEGEND COMES ON WHITE) : CLOSURE OF THE OVERBOARD EXTRACT VALVE IN EXCEPTIONAL CIRCUMSTANCES : FAILURE OF AUTOMATIC CLOSURE OR COLD WEATHER WITH AIRCRAFT ON GROUND.

- 4. AMBER FAULT LEGEND ON OVBD VALVE PUSHBUTTON SWITCH
  - LEGEND COMES ON IF THE OVERBOARD EXTRACT VALVE FAILS IN FULL OPEN POSITION.

- 5. OVBD VALVE/INBD ANNUNCIATIOR (INDICATES THE AIRFLOW PATH)
  - OVBD FLOWBAR ON, INBD FLOWBAR OFF :
    - AIR IS DIRECTLY EVACUATED OVERBOARD; THE OVERBOARD EXTRACT VALVE IS FULLY OR PARTIALLY OPEN.
  - INBD FLOWBAR ON, OVBD FLOWBAR OFF :
    - AIR IS EVACUATED UNDER THE CARGO COMPARTMENT FLOOR; THE INBOARD EXTRACT VALVE IS OPEN.

BM6 21 23 00 0 AETO 13

Overhead Panel - VENT Panel 438VU (OVBD VALVE/INBD)
Figure 006



- 1. INS RACK VENT WARNING LIGHT :
  - COMES ON IN THE EVENT OF INSUFFICIENT AIRFLOW ON THE GROUND (IN FLIGHT COMPARTMENT. ILLUMINATION OF FLOW LEGEND ON EXTRACT PUSHBUTTON SWITCH).
- 2. MECHANIC CALL HORN 4WC :
  - ACTIVATED IN THE SAME CONDITIONS AS THE INS RACK VENT WARNING LIGHT.

NOTE : WHEN ENGINES ARE RUNNING, HORN IS INHIBITED.

BM5 21 23 00 0 AHPO - 15

Ground Warnings
Figure 007

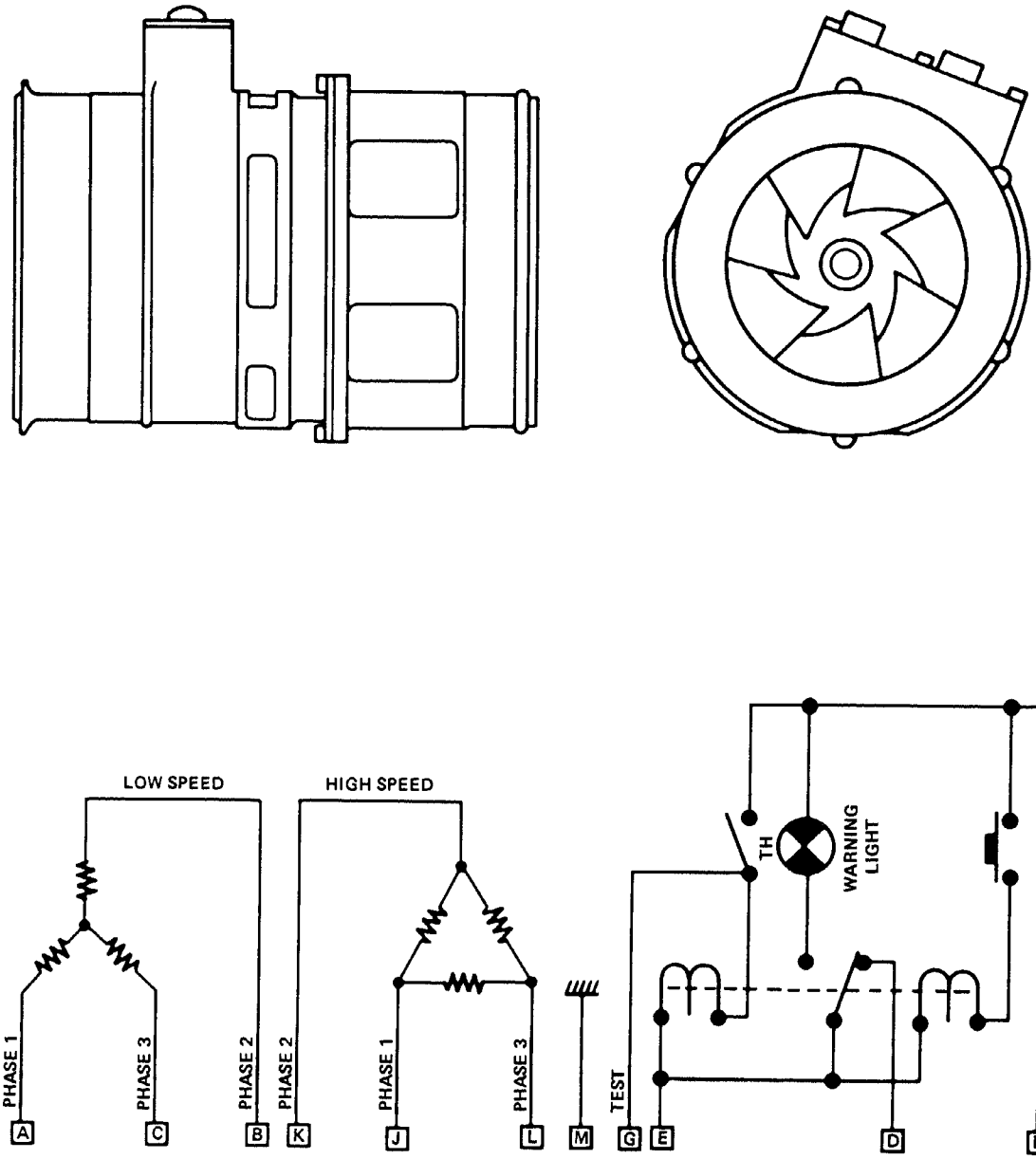
4. Component Description

A. Extract Fan 73HR
(Ref. Fig. 008)
The fan serves to extract the air ventilating the electronics racks. It is of the axial type driven by a 115VAC two-speed electric motor ; 7800 rpm low speed, 11600 rpm, high speed.
The fan is equipped with a protection system which causes the fan to stop in the event of overheat.
NOTE : The pushbutton switch and warning light located on the fan body are only used to test the fan on workshop test bench, when fan is removed from aircraft.

B. Overboard Extract Valve 75HR
(Ref. Fig. 009)
The valve is installed downstream of the extract fan and is designed to evacuate the extraction air directly overboard.
The valve is controlled by an electric motor and an actuator ; the actuator opens or closes the valve by converting the rotational movement of the motor into linear movement.
The valve has three positions : fully open, fully closed and an intermediate position.
These positions are obtained by cutting off power supply to the motor via microswitches.
The valve is equipped with a manual control handle which serves to close or open the valve manually in case of motor failure. In normal configuration, the control handle is locked up (flush) ; a pushbutton identified PUSH is provided to unlock the handle.

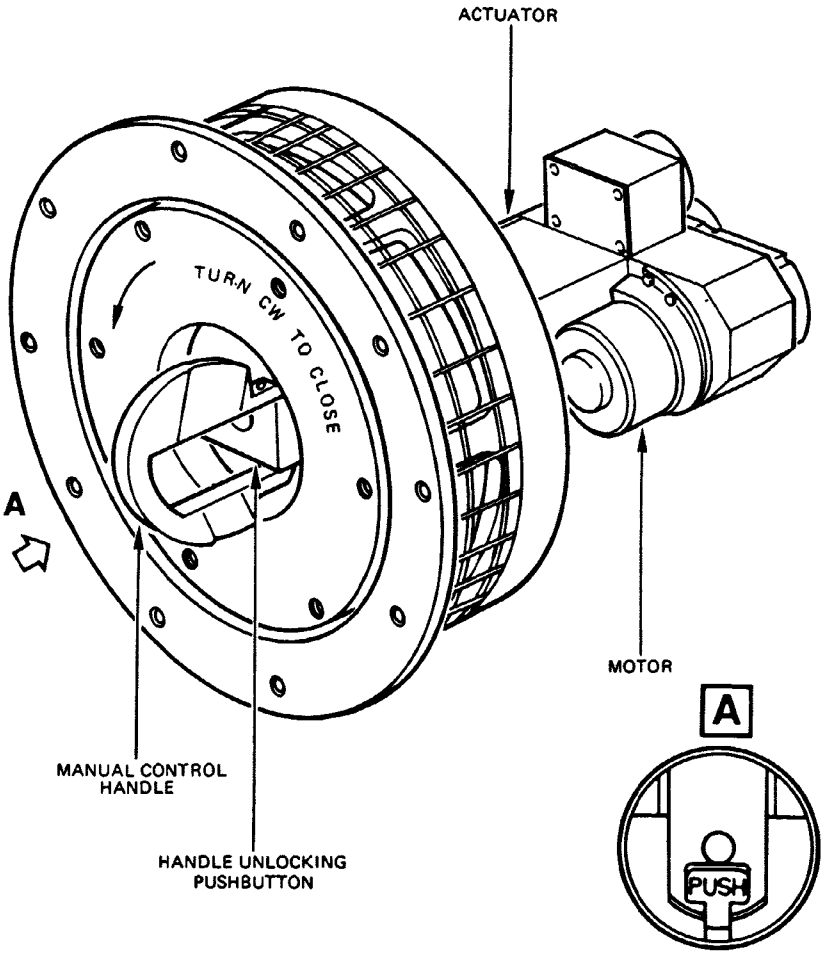
C. Inboard Extract Valve 74HR
(Ref. Fig. 010)
The valve is installed downtream of the extract fan and is designed to evacuate extraction air under the forward cargo compartment floor when the overboard extract valve is closed.
The valve is of the butterfly type electrically controlled by an actuator.
Two positions are available : fully open or fully closed. Two limit microswitches serve to indicate the fully open and fully closed positions of the valve.
The valve is also equipped with a visual position indicator.

D. Airflow Detector 72HR
(Ref. Fig. 011)
The detector is installed in the air extraction system upstream of the extract fan. When insufficient airflow is detected for a period longer than or equal to 3 minutes, the detector causes warnings to be activated.
The detection is made by a thermistor cooled by the airflow.
Two detection levels are available, depending on whether the extract fan operates at high speed or low speed.

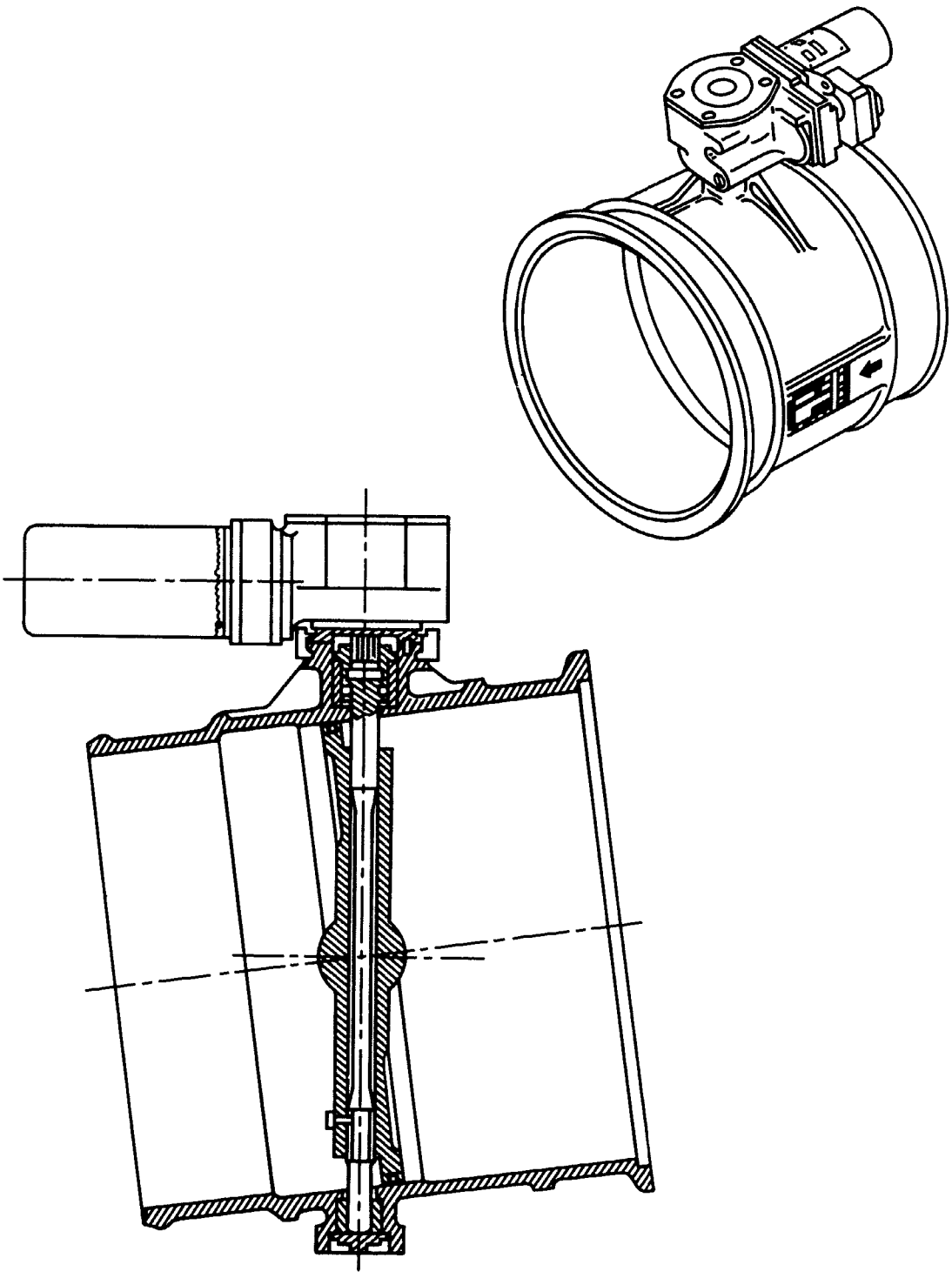


BM5 21 23 00 0 AKPO-15

Extract Fan 73HR
Figure 008



Overboard Extract Valve 75HR
Figure 009



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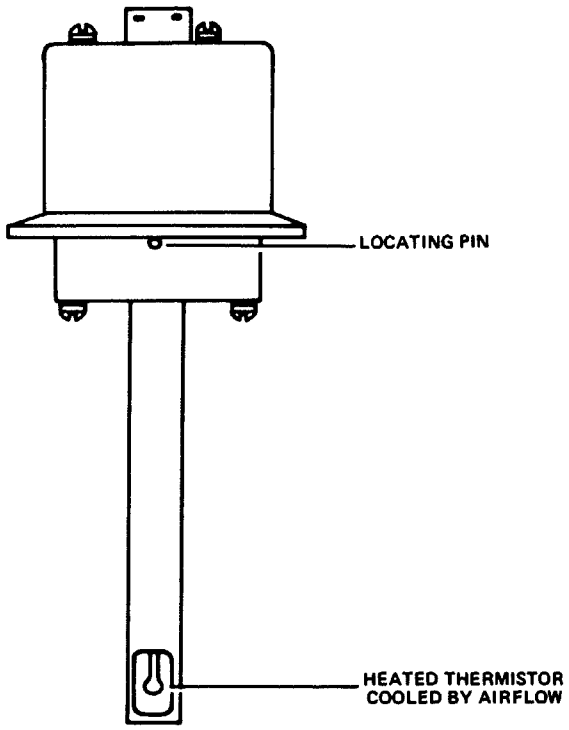
Inboard Extract Valve 74HR
Figure 010



BM5 21 23 00 0 APMO

Airflow Detector 72HR
Figure 011

5. Operation
(Ref. Fig. 012)

A. Automatic Normal Operation
- EXTRACT pushbutton switch 66HR pressed (in)
- OVBD VALVE pushbutton switch 65HR pressed (in) (AUTO).

(1) On the ground with one or both engines shut down
Extract fan 73HR operates at high speed ; overboard extract valve 75HR is open, inboard extract valve 74HR is closed : normal air extraction mode, air is evacuated overboard.
NOTE : At fan start up, extract fan 73HR operates at low speed for 30 seconds then switches to high speed.

(2) In flight or on the ground at second engine start-up or if both engines are running.
Extract fan 73HR operates at low speed ; overboard extract valve 75HR closes and inboard extract valve 74HR opens : extracted air is evacuated under the forward cargo compartment floor.

B. Faulty Operation

(1) Insufficient airflow detection
Insufficient airflow is caused by the following failures :
- On the ground, with engines shut down, extract fan failure or overboard extract valve failure in closed position.
- On the ground, after engine start-up, or in flight, extract fan failure or inboard extract valve failure in closed position.

Airflow detector 72HR detects insufficient airflow and causes after a three-minute time delay :
- illumination of the FLOW legend on EXTRACT pushbutton switch 66HR
- activation of the ground warnings
- activation of the central warnings with message display on the left ECAM display unit.

NOTE : The overboard extract valve can be opened manually by means of its manual control handle.

(2) Overboard extract valve position fault
If the valve fails to close at start up of the two engines, the valve internal microswitch causes :
- illumination of the FAULT legend on OVBD VALVE pushbutton switch 65HR
- activation of the central warnings with message display on the left ECAM display unit and indication on the CAB PRESS page on the right ECAM display unit.

NOTE : The overboard extract valve can be closed manually by means of its manual control handle.

C. Operation in OVBD (Overboard) Mode
If the normal air extraction mode fails, the OVBD mode can be selected by releasing EXTRACT pushbutton switch 66HR. This action controls partial opening or closing of overboard extract valve 75HR. In this configuration, air extraction is ensured by the cabin differential pressure.
The OVBD mode can also be selected in flight, for example in case of smoke detection, ensuring thereby evacuation of smoke directly overboard through

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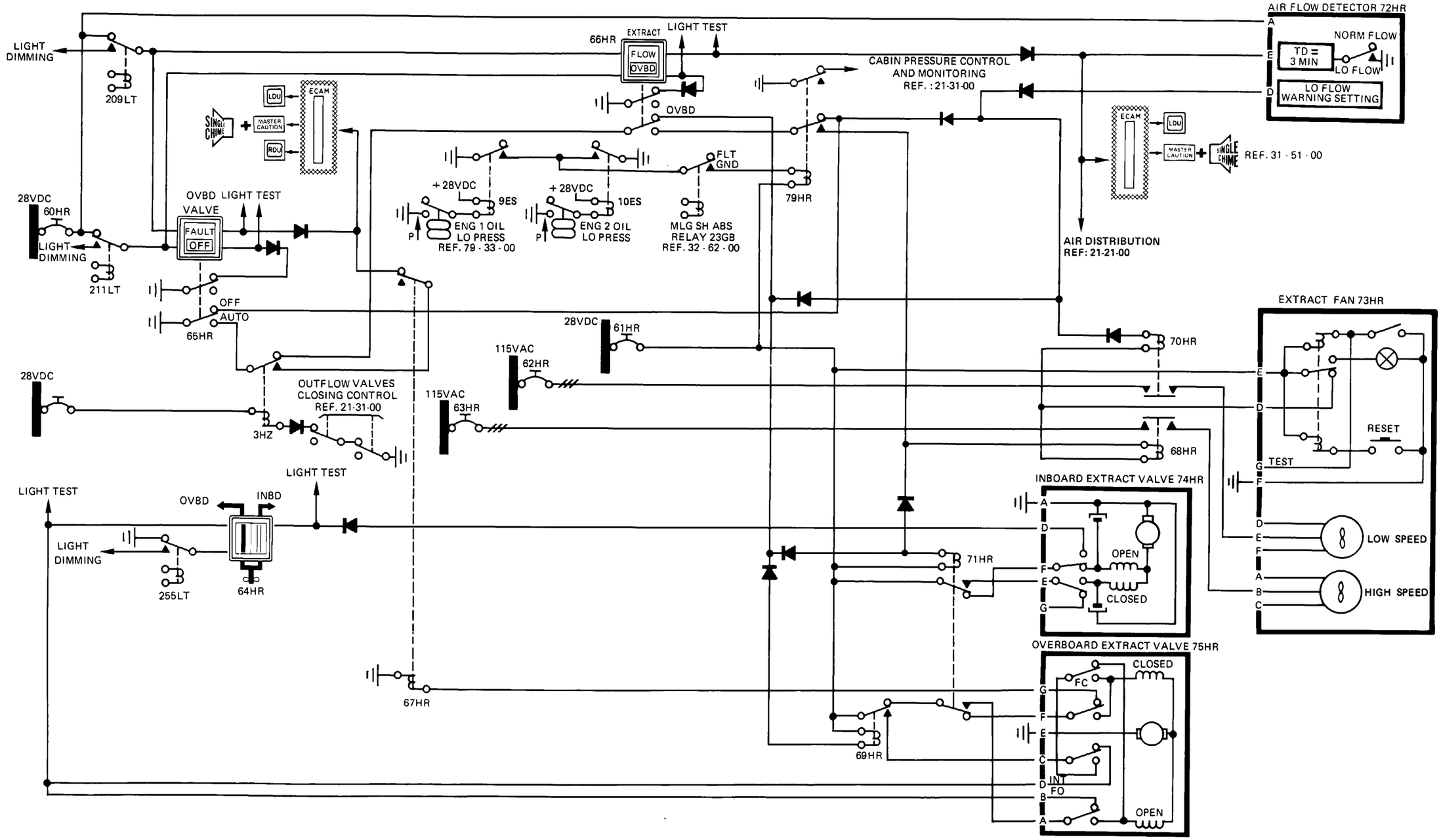


BM5 21 23 00 0 TSMO - 01/30

Electronics Racks Air Extraction - Schematic
Figure 012

the partially open overboard extract valve.
The partially open position of the valve can be checked on the **CAB PRESS** page on the right **ECAM** display unit.

D. Ground Operation Under Cold Weather Conditions
The overboard extract valve can be closed on the ground by releasing **OVBD VALVE** pushbutton switch **65HR (OFF** Legend on). This action also causes the extract fan to operate at low speed and the inboard extract valve to open, thus ensuring evacuation of air under the forward cargo compartment floor when cold weather conditions are encountered.

E. Safety Devices at Ditching
Closure of the cabin pressure outflow valves (Ref. 21-31-00) causes or confirms closure of the overboard extract valve.

R

R 1. Operational Test of Overboard Valve FAULT Warning and Partial Opening
R (OVBD Mode)

A. Reason for the Job
To make certain that electronics racks air extraction operates correctly.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 32-00-00, P. Block 501	Landing Gear

C. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Make certain that overhead and rear panel circuit breakers are closed, particularly those associated with VENT panel 131VU, HYDRAULIC panel 133VU (LDG GEAR/FLT/GND).
(c)On ECAM control panel (center pedestal)
- using RIGHT DISPLAY knob, adjust brightness on R ECAM display unit
- press PRESS pushbutton switch : pushbutton switch integral light comes on
- on R ECAM display unit, CAB PRESS page is displayed.

WARNING : PRIOR TO OPENING CIRCUIT BREAKER 119GB, TAKE THE APPROPRIATE SAFETY PRECAUTIONS (REF. 32-00-00, P. BLOCK 501).

WARNING : FWD AND AFT OUTFLOW VALVES WILL MOVE TO THE CLOSED POSITION DURING THE TEST.

(2)Test

ACTION	RESULT
	- overboard extract valve is open and inboard extract valve is closed. On VENT panel 438VU - on OVBD VALVE/INBD annunciator, OVBD flowbar is on.
1. On circuit breaker panel 131VU - open VENTILATION/EXTRACT FAN HI SPD circuit breaker 63HR (location 311/H64)	- extract fan (73HR) stops. After 3 min 20 sec approx. . On panel 438VU - FLOW legend on EXTRACT pushbutton switch comes on. . In nose landing gear well - horn is activated.

ACTION	RESULT
	NOTE : Switch off horn using RESET pushbutton switch on interphone box located in nose landing gear well as soon as horn is activated. After 12 seconds approx. . On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on. . Aural warning : single chime. On L ECAM display unit, the following message is displayed AIR VENT EXTRACT LO FLOW
2. On circuit breaker panel 133VU - open LDG GEAR PROX DET & RELAYS/ SYS 1/FLT/GND circuit breaker 119GB (location 331/U52).	- extract fan operates at low speed - overboard extract valve closes - inboard extract valve opens. On panel 438VU, on OVBD VALVE/INBD annunciator - INBD flowbar comes on - OVBD flowbar goes off. On panel 438VU - FLOW legend on EXTRACT pushbutton switch goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. On L ECAM display unit, message disappears.
3. On circuit breaker panel 131VU - close circuit breaker 63HR.	No change.
4. On circuit breaker panel 133VU - open LDG GEAR PROX DET & RELAYS/SYS2/FLT/GND circuit breaker 1GB (location 331/V52). - open LDG SYS1 RELAY AND RETRACT CONTROL circuit breaker 2 GB (location 332 U51)	No change. NOTE : Ignore all the warnings not related to the test.

NOTE : During the test, when LDG GEAR circuit breakers 1GB and 119GB are open (flight configuration), after 2 minutes approx., a flight phase change occurs in the FWC and the MASTER CAUTION lights come on, on CAPT and F/O main instrument panels. Therefore, when the MASTER CAUTION lights come on, clear them to the normal flight configuration.

ACTION	RESULT
5. On circuit breaker panel 22VU - open VENT/EXTRACT/FAN SUPPLY LO SPD circuit breaker 62HR (location 202/H22).	- extract fan stops. After 3 min 20 sec approx. . On panel 438VU - FLOW legend on EXTRACT pushbutton switch comes on After 12 seconds approx. . On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on . Aural warning : single chime. On L ECAM display unit, the following message is displayed AIR VENT EXTRACT LO FLOW - VENT EXTRACT ..... OVBD
6. On VENT panel 438VU - release EXTRACT pushbutton switch	- inboard extract valve closes. - overboard extract valve moves to the partially open position. On panel 438VU - OVBD legend on EXTRACT push-button switch comes on. - on OVBD VALVE/INBD annunciator, OVBD flowbar comes on. On L ECAM display unit, the following message disappears: - VENT EXTRACT ..... OVBD On CAB PRESS page (R ECAM display unit) - overboard extract valve is indicated partially open.
7. On circuit breaker panel 22VU - close circuit breaker 62HR.	- extract fan operates again at low speed. On panel 438VU - FLOW legend on EXTRACT push-button switch stays on or goes off. NOTE : Because aircraft is not pressurized on ground, FLOW indicator light can stay on or go off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. On L ECAM display unit, the following message disappears:

R

ACTION	RESULT
	AIR VENT EXTRACT LO FLOW
8. On VENT panel 438VU - press EXTRACT pushbutton switch	- inboard extract valve opens. - overboard extract valve closes. On panel 438VU - on OVBD VALVE/INBD annunciator, INBD flowbar comes on and OVBD flowbar goes off. - OVBD legend on EXTRACT pushbutton switch goes off.
9. Open overboard extract valve by means of manual control handle CAUTION : Manual control handle must not be held in open position more than 5 seconds - release manual control handle	On panel 438VU - FAULT legend on OVBD VALVE pushbutton switch comes on. On panel 438VU - FAULT legend on OVBD VALVE pushbutton switch goes off.
10. On circuit breaker panel 133VU - close circuit breaker 1GB, 2GB - close circuit breaker 119GB.	No change. - extract fan operates at high speed - overboard extract valve opens - inboard extract valve closes. On panel 438VU - on OVBD VALVE/INBD annunciator, OVBD flowbar comes on and INBD flowbar goes off.

(3)Close-up
(a)Restore system and aircraft to normal operating condition.
(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2. Operational Test of FLOW Warning Including Aural Warning

A. Reason for the Job
To check the FLOW and Aural Warning.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 32-00-00, P. Block 501	Landing Gear
- 24-41-00, P. Block 301	AC External Power Control

C. Procedure

(1)Job Set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that overhead and rear panel circuit breakers are closed, particularly those associated with VENT panel 131VU, HYDRAULIC panel 133VU (LDG GEAR/FLT/GND).

(c)On ECAM control panel (center pedestal)

- Using RIGHT DISPLAY knob, adjust brightness on R ECAM display unit.
- Press PRESS pushbutton switch : pushbutton switch integral light comes on.
- On R ECAM display unit, CAB PRESS page is displayed.

WARNING : PRIOR TO OPENING CIRCUIT BREAKER 119GB, TAKE THE APPROPRIATE SAFETY PRECAUTIONS (REF. 32-00-00, P.BLOCK 501).

WARNING : FWD AND AFT OUTFLOW VALVES WILL MOVE TO THE CLOSED POSITION DURING THE TEST.

(2)Test

ACTION	RESULT
	- Overboard extract valve is open and inboard extract valve is closed. On VENT panel 438VU - On OVBD VALVE/INBD annunciator, OVBD flowbar is on.
1. On circuit breaker panel 131VU : - Open VENTILATION/EXTRACT FAN HI SPD circuit breaker 63HR.	- Extract fan (73HR) stops. - After 3 min 20 sec approx., On panel 438VU : - FLOW legend on EXTRACT pushbutton switch comes on. . In nose landing gear well - Horn is activated. NOTE : Switch off horn using RESET pushbutton switch on inter-phone box located in nose landing gear well as soon as horn is activated. - After 12 seconds approx., On CAPT AND F/O main instrument panels 3VU and 5VU : - MASTER CAUTION lights come on. . Aural warning : single chime. On L ECAM display unit, the following message is displayed : AIR VENT EXTRACT LO FLOW.
2. On circuit breaker panel 133VU : - Open LDG GEAR PROX DET & RELAYS/SYS 1/FLT/GND circuit breaker 119GB.	- Extract fan operates at low speed. - Overboard extract valve closes. - Inboard extract valve opens.

ACTION	RESULT
	On panel 438VU, on OVBD VALVE/INBD annunciator : - INBD flowbar comes on. - OVBD flowbar goes off. On panel 438VU : - FLOW legend on EXTRACT pushbutton switch goes off. On CAPT and F/O main instrument panels 3VU and 5VU : - MASTER CAUTION lights go off. On L ECAM display unit, message disappears.
3. On circuit breaker panel 131VU : - Close circuit breaker 63HR.	No change.
4. On circuit breaker panel 133VU : - Open LDG GEAR PROX DET & RELAYS/SYS2/FLT/GND circuit breaker 1GB. - Open LDG SYS1 RELAY AND RETRACT CONTROL circuit breaker 2GB.	No change. NOTE : Ignore all the warnings not related to the test.
NOTE : During the test, when LDG GEAR circuit breakers 1GB and 119GB are open (flight configuration), after 2 minutes approx., a flight phase change occurs in the FWC and the MASTER CAUTION light come on, on CAPT and F/O main instrument panels. Therefore, when the MASTER CAUTION lights come on, clear them to the normal flight configuration.	
5. On circuit breaker panel 22VU : - Open VENT/EXTRACT/FAN SUPPLY LO SPD circuit breaker 62HR	- Extract fan stops. - After 3 min 20 sec approx., . on panel 438VU : - FLOW legend on EXTRACT pushbutton switch comes on. - After 12 seconds approx., on CAPT and F/O main instrument panels 3VU and 5VU : - MASTER CAUTION lights come on. . Aural warning : single chime. On L ECAM display unit, the following message is displayed : AIR VENT EXTRACT LO FLOW - VENT EXTRACT ..... OVBD.
6. On VENT panel 438VU : - Release EXTRACT pushbutton switch.	- Inboard extract valve closes. - Overboard extract valve moves to the partially open position.

ACTION	RESULT
	On panel 438VU : - OVBD legend on EXTRACT push-button switch comes on. - On OVBD VALVE/INBD annunciator, OVBD flowbar comes on. On L ECAM display unit, the following message disappears : - VENT EXTRACT ..... OVBD. On CAB PRESS page (R ECAM display unit) : - Overboard extract valve is indicated partially open.
7. On circuit breaker panel 22VU : - Close circuit breaker 62HR.	- Extract fan operates again at low speed. On panel 438VU : - FLOW legend on EXTRACT push-button switch goes off. NOTE : Because aircraft is not pressurized on ground, FLOW indicator light can stay on or go off. On CAPT and F/O main instrument panels 3VU and 5VU : - MASTER CAUTION lights go off. On L ECAM display unit, the following message disappears : AIR VENT EXTRACT LO FLOW.
8. On VENT panel 438VU : - Press EXTRACT pushbutton switch.	- Inboard extract valve opens. - Overboard extract valve closes. On panel 438VU : - On OVDB VALVE/INBD annunciator, INBD flowbar comes on and OVBD flowbar goes off. - OVBD legend on EXTRACT pushbutton switch goes off.
9. Open overboard extract valve by means of manual control handle. CAUTION : MANUAL CONTROL HANDLE MUST NOT BE HELD IN OPEN POSITION MORE THAN 5 SECONDS. - Release manual control handle.	On panel 438VU : - FAULT legend on OVBD VALVE pushbutton switch comes on. On panel 438VU : - FAULT legend on OVBD VALVE pushbutton switch goes off.

ACTION	RESULT
10.On circuit breaker panel 133VU :	
- Close circuit breaker 1GB, 2GB.	No change.
- Close circuit breaker 119GB.	- Extract fan operates at high speed. - Overboard extract valve opens. - Inboard extract valve closes. On panel 438VU : - On **OVBD VALVE/INBD** annunciator, **OVBD** flowbar comes on and **INBD** flowbar goes off.

(3)Close-up
(a)Restore system and aircraft to normal operating condition.
(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

1. Blowers Operation
Ref. MMEL 21-23-02 (FAA only)

A. Deactivation
(1)Equipment and materials

ITEM	DESIGNATION
(a)	Access Platform 2.75 m (9 ft)
(b)	Circuit Breaker Safety Clips
Referenced Procedures - 24-41-00, P. Block 301	AC External Power Control

(2)Procedure
(a)Job set-up
1 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
2 Make certain that electronics racks ventilation is correct.
3 Open, safety and tag the following circuit breakers :

	PANEL	SERVICE	IDENT.	LOCATION
R	22VU	VENT/EXTRACT/FAN SUPPLY LO SPD	62HR	202/H22
R	101VU	VENTILATION/EXTRACT FAN HI SPD	63HR	GEN 1/B05
	128VU	LDG GEAR PROX DET & RELAYS/SYS2/FLT/GND	1GB	331/V52
	128VU	LDG GEAR PROX DET & RELAYS/SYS1/FLT/GND	2GB	332/U51

(b)Check blowers 67HQ and 72HQ normal functioning by an aural control in the avionics compartment.
(c)Close-Up
1 Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
2 Remove access platform.
3 Remove safety clips and tags and close circuit breakers 62HR ,63HR 1GB and 2GB.

B. Reactivation
(1)Not applicable.

R 2. Inboard Extract Valve (74HR)
R Ref. MMEL 21-23-08 (FAA only)

R A. Deactivation
R (1)Equipment and materials

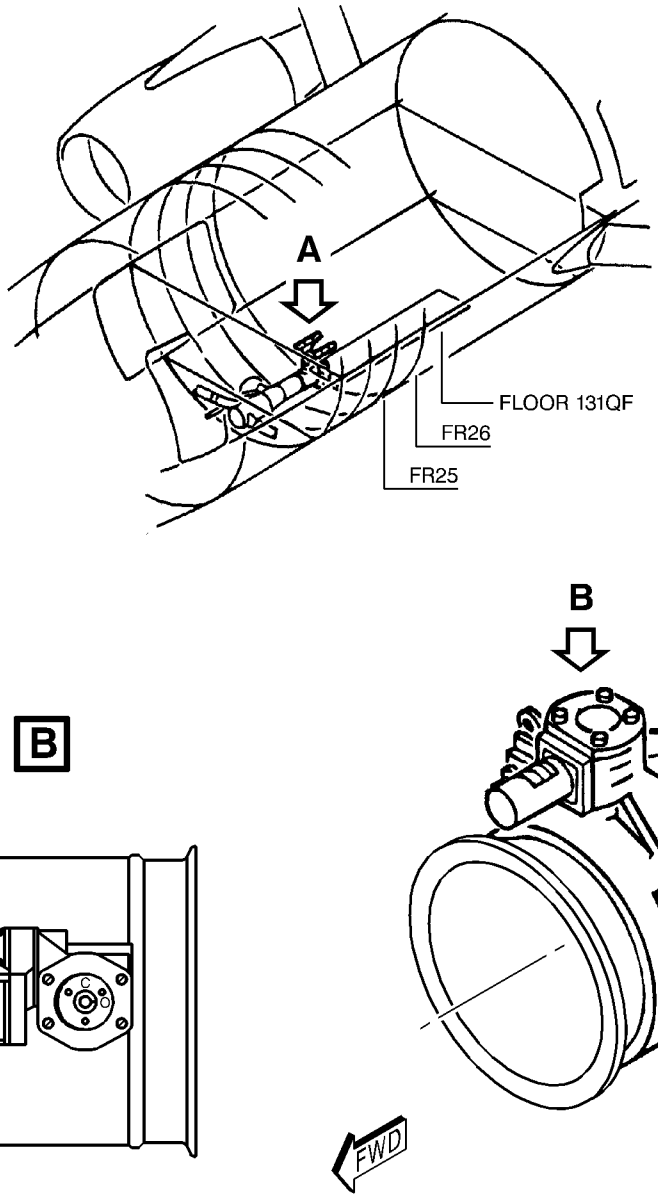
ITEM	DESIGNATION
(a)	Access Platform 2 m (6 ft. 7 in.)
(b)	Circuit Breaker Safety Clip
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 53-10-29, P. Block 401	Panels - FWD Cargo Compartment Floor

R (2)Procedure
R (Ref. Fig. 901)
R (a)Job set-up
R 1 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
R 2 Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
22VU	VENT/EXTRACT/FAN & VALVES CTL	61HR	202/H20

R 3 Position access platform.
R 4 In forward cargo compartment, remove floor panel 131QF (Ref. 53-10-29, P. Block 401).
R (b)Check for correct condition of electrical connector.
R (c)Make sure that the inboard extract valve (74HR) is open.
R NOTE : The visual indicator shows 0 position.
R (d)Close-up
R 1 Install floor panel 131QF (Ref. 53-10-29, P. Block 401).
R 2 Remove access platform.
R 3 Remove safety clip and tag and close circuit breaker 61HR.
R 4 De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

R B. Reactivation
R (1)Not applicable.



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Inboard Extract Valve (74HR)
Figure 901

R

EXTRACT FAN (73HR) - REMOVAL/INSTALLATION

CAUTION : DE-ENERGIZE THE AIRCRAFT ELECTRICAL NETWORK (PROTECTION OF ELECTRIC AND ELECTRONIC COMPONENTS IN AVIONICS COMPARTMENT).

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2 m (6 ft. 1 in.)
B.	Torque Wrench 0.6 m.daN (53 lbf.in.)
C.	Circuit Breaker Safety Clips
D.	Blanking Plugs/Caps
E.	O-Ring
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 32-00-00, P. Block 501	Landing Gear

2. Procedure
(Ref. Fig. 401)

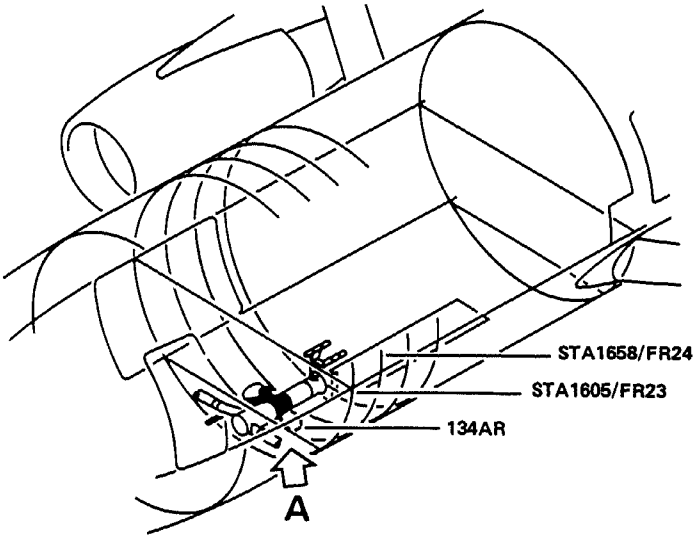
A. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

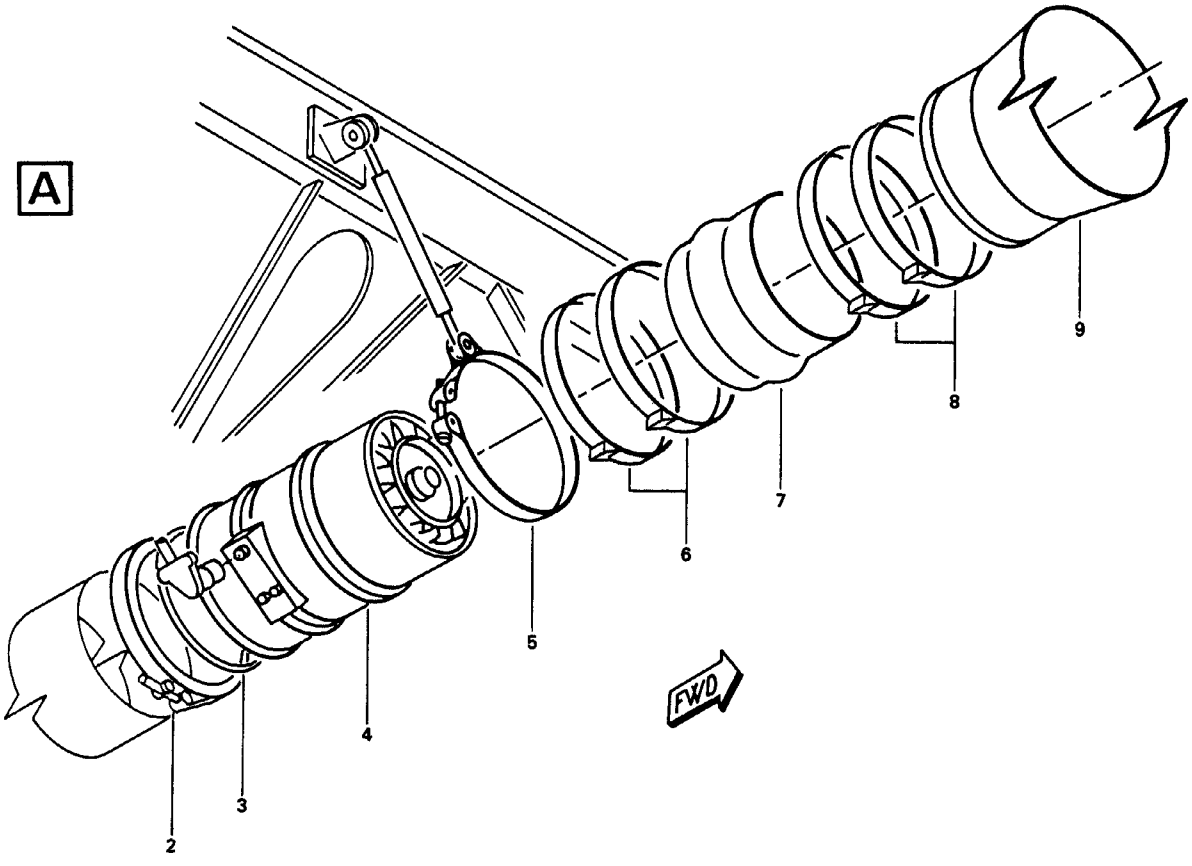
	PANEL	SERVICE	IDENT.	LOCATION
	22VU	VENT/EXTRACT/FAN & VALVES/WARN	60HR	202/H19
R	22VU	VENT/EXTRACT/FAN SUPPLY LO SPD	62HR	202/H22
R	131VU	VENTILATION/EXTRACT FAN HI SPD	63HR	311/H64

(2)Position access platform.
(3)Remove access door (134AR)

B. Removal
(1)Disconnect electrical connector (1) from fan.
(2)Remove clamps (6), loosen clamps (8) and slide flexible sleeve (7) onto duct (9) to free fan.
(3)Remove clamp (2).
(4)Support fan, open attachment clamp (5). Remove fan (4). Discard O-ring (3)
(5)Cap open duct ends and electrical connector.

C. Installation
(1)Remove blanking caps from duct and electrical connector (1). Check for correct condition of duct flange flexible sleeve (7) and electrical connector (1).
(2)Clean and inspect fan interface and/or adjacent area.
(3)Install O-ring (3) in groove in fan flange.
(4)Install fan (4) in flexible sleeve (7). Check that the O-ring remains correctly in the groove in fan flange. Install attachement clamp (5).





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Extract Fan (73HR)
Figure 401

Do not fully tighten at this stage.
(5)Position fan (4) to allow connection of the electrical connector (1) without excessive stress or slack.
(6)Install clamp (2). TORQUE nut to the value given on clamp.
(7)Install flexible sleeve (7). Install and tighten clamps (6) and (8).
(8)Tighten attachment clamp (5).
(9)Connect electrical connector (1).
(10)Remove safety clips and tags and close circuit breakers 60HR, 62HR and 63HR.

D. Test
Initial Conditions
- correct electrical power supply
- panel circuit breakers closed particularly those associated with VENT/EXTRACT.

WARNING : PRIOR TO OPENING CIRCUIT BREAKER 119GB TAKE THE APPROPRIATE SAFETY PRECAUTIONS (REF. 32-00-00, P. BLOCK 501).

ACTION	RESULT
	Extract fan is running at high speed.
On circuit breaker panel 133VU	
1. Open LDG GEAR/PROX DET & RELAYS/SYS1/FLT/GND circuit breaker 119GB (location 332/U52)	Overboard extract valve closes. Inboard extract valve opens. Extract fan is running at low speed. On VENT panel 438VU - On OVBD VALVE/INBD annunciator, INBD flowbar comes on and OVBD flowbar goes off.
2. Close circuit breaker 119GB	Extract fan is running at high speed. Overboard extract valve opens. Inboard extract valve closes. On panel 438VU, OVBD VALVE/INBD annunciator - INBD flowbar goes off - OVBD flowbar comes on.

E. Close-Up
(1)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Install access door (134AR).
(4)Remove access platform.

1. Deactivation/Reactivation (REF. MMEL Sect. 1-21, item 45a))

CAUTION : THIS PROCEDURE MUST BE USED ACCORDING TO THE REQUIREMENTS ON THE MMEL.

A. Deactivation

(1)Equipment and Materials

ITEM	DESIGNATION
(a)	Circuit Breaker Safety Clips
Referenced Procedures - TSM 21-20-00 Block 501	Flight Compartment and Electronics Racks Air Distribution, Electronics Racks Air Extraction Smoke or Burning Smells in Cabin

(2)Procedure

(a)Open, safety and tag following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILATION/BLOWERS/WARN	76HQ	311/H60

(b)Remove relay box 103VU cover.
(c)In relay box 103VU, remove relay 92HQ.
(d)Install relay box 103VU cover.
(e)Close circuit breaker 76HQ.
(f)When EXTRACT pushbutton switch 66HR is released, the OVBD legend comes on white (overboard extract valve 75HR partially open).
(g)Both air conditioning packs are operative.
(h)Make an entry in the aircraft technical log.

B. Reactivation

(1)Procedure

(a)Open, safety and tag following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILATION/BLOWERS/WARN	76HQ	311/H60

(b)Remove relay box 103VU cover.
(c)In relay box 103VU, install relay 92HQ.
(d)Install relay box 103VU cover.
(e)Troubleshoot the system (Ref. TSM 21-20-00).
(f)Remove safety clip and tag and close circuit breaker 76HQ.
(g)Clear technical log.

2. Deactivation/Reactivation (REF. MMEL 21-23-03 (FAA only))

A. Deactivation

(1)Equipment and materials

ITEM	DESIGNATION
(a)	Circuit Breaker Safety Clips

(2)Procedure

(a)Open, safety and tag following circuit breakers :

	PANEL	SERVICE	IDENT.	LOCATION
	21VU	CALLS/MECH	1WC	101/J08
	22VU	VENT/EXTRACT/FAN SUPPLY LO SPD	62HR	202/H22
R	131VU	VENTILATION/EXTRACT FAN HI SPD	63HR	311/H64

(b)When EXTRACT pushbutton switch 66HR is released, the OVBD legend comes on white (overboard extract valve 75HR partially open).

(c)Both air conditioning packs are operative.

(d)Make an entry in the aircraft technical log.

B. Reactivation

(1)Procedure

(a)Troubleshoot the system (Ref. TSM 21-23-00).

(b)Remove safety clips and tags and close circuit breakers 1WC, 62HR and 63HR.

(c)Clear technical log.

INBOARD EXTRACT VALVE (74HR) - REMOVAL/INSTALLATION

1. Valve/Actuator Assembly

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2 m (6 ft. 7 in.)
(2)	Torque Wrench 0.6 m.daN (53 lbf.in.)
(3)	Blanking Plugs/Caps
(4)	Circuit Breaker Safety Clips
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 32-00-00, P. Block 501	Landing Gear

B. Procedure
(Ref. Fig. 401)

(1) Job set-up

(a) Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
22VU	VENT/EXTRACT/FAN & VALVES/CTL	61HR	202/H20

(b) Position access platform.

(c) In forward cargo compartment, remove floor panel 131QF.

(2) Removal

(a) Disconnect bonding strips (4).

(b) Disconnect electrical connector (3) from valve (7).

(c) Remove clamps (2), loosen clamps (1) and slide flexible sleeve (8) onto duct to free valve (7).

(d) Remove clamp (5) and valve (7).

(e) Cap open duct ends and electrical connector (3).

(3) Installation

(a) Remove blanking caps from ducts and electrical connector (3). Check for correct condition of clamp, flexible sleeve (8) and electrical connector (3).

(b) Clean and inspect valve (7) interface and/or adjacent area.

(c) Install valve (7) between duct (6) and flexible sleeve (8) ; the arrow indicating direction of airflow is pointing rearwards.

(d) Rotate valve (7), with actuator on right side of aircraft centerline to allow connection of electrical connector (3) without excessive stress or slack.

(e) Install clamp (5). TORQUE nut to value given on clamp.

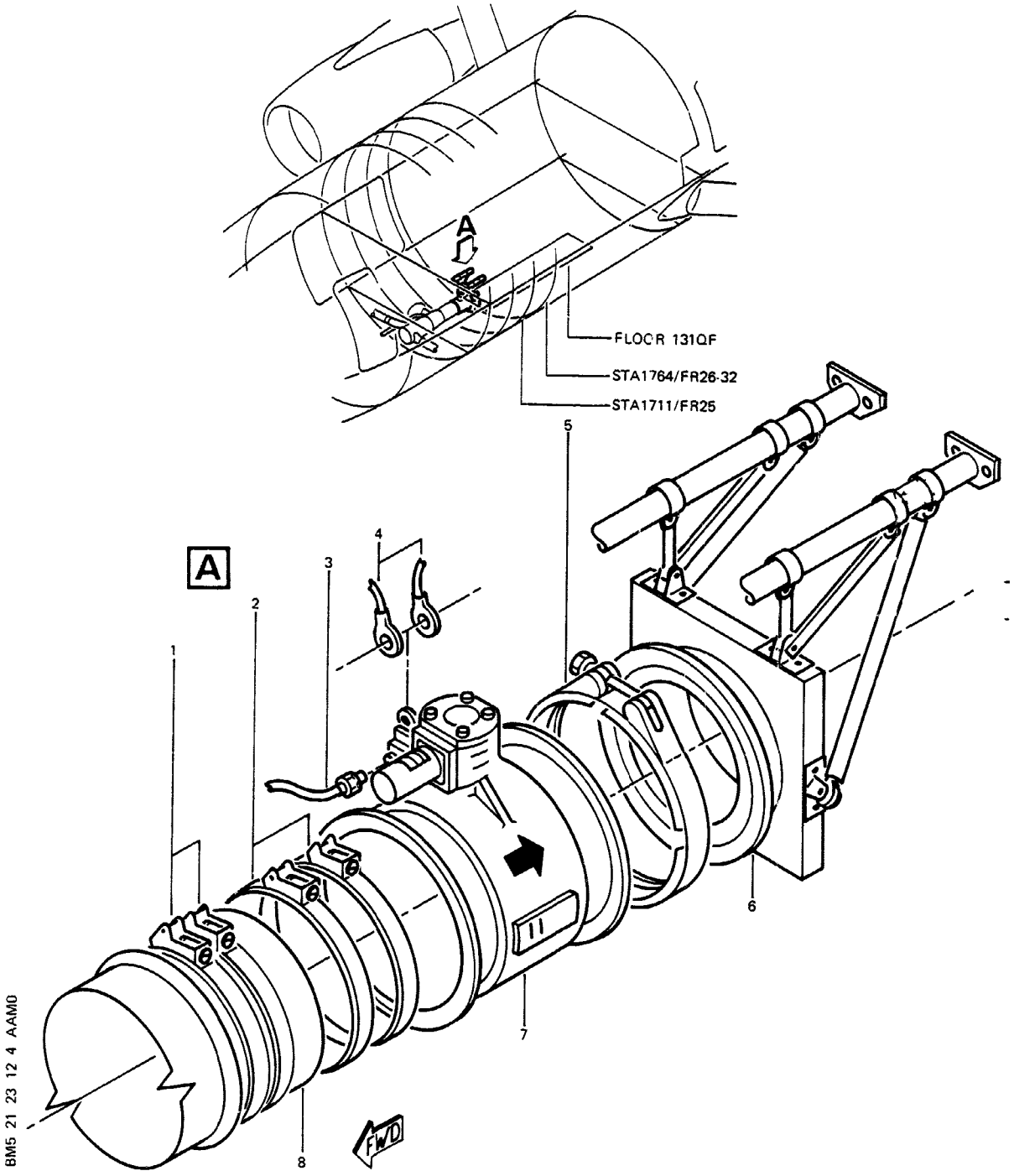
(f) Install flexible sleeve (8). Install and tighten clamps (1) and (2).

(g) Connect electrical connector (3).

(h) Connect bonding strips (4).

(i) Remove safety clip and tag and close circuit breaker 61HR.

(4) Test



Inboard Extract Valve (74HR)
Figure 401

Initial Conditions
- correct electrical power supply
- panel circuit breakers closed particularly those associated with **VENT/EXTRACT.**

WARNING : **PRIOR TO OPENING CIRCUIT BREAKER 119GB, TAKE THE APPROPRIATE SAFETY PRECUATIONS (Ref. 32-00-00, P. Block 501).**

ACTION	RESULT
	On **VENT** panel **438VU** On **OVBD VALVE/INBD** annunciator - **OVBD** flowbar is on - **INBD** flowbar is off Inboard extract valve is closed.
On circuit breaker panel **133VU** 1. Open **LDG GEAR/PROX DET & RELAYS/SYS1/ FLT/GND** circuit breaker **119GB** (location **332/U52**)	On panel **438VU** On **OVBD VALVE/INBD** annunciator - **INBD** flowbar comes on - **OVBD** flowbar goes off. Inboard extract valve is open.
2. Close circuit breaker **119GB.**	On panel **438VU** On **OVBD VALVE/INBD** annunciator - **OVBD** flowbar comes on - **INBD** flowbar goes off. Inboard extract valve is closed.

(5)Close-up
(a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(c)Install floor panel **131QF.**
(d)Remove access platform.

2. Actuator

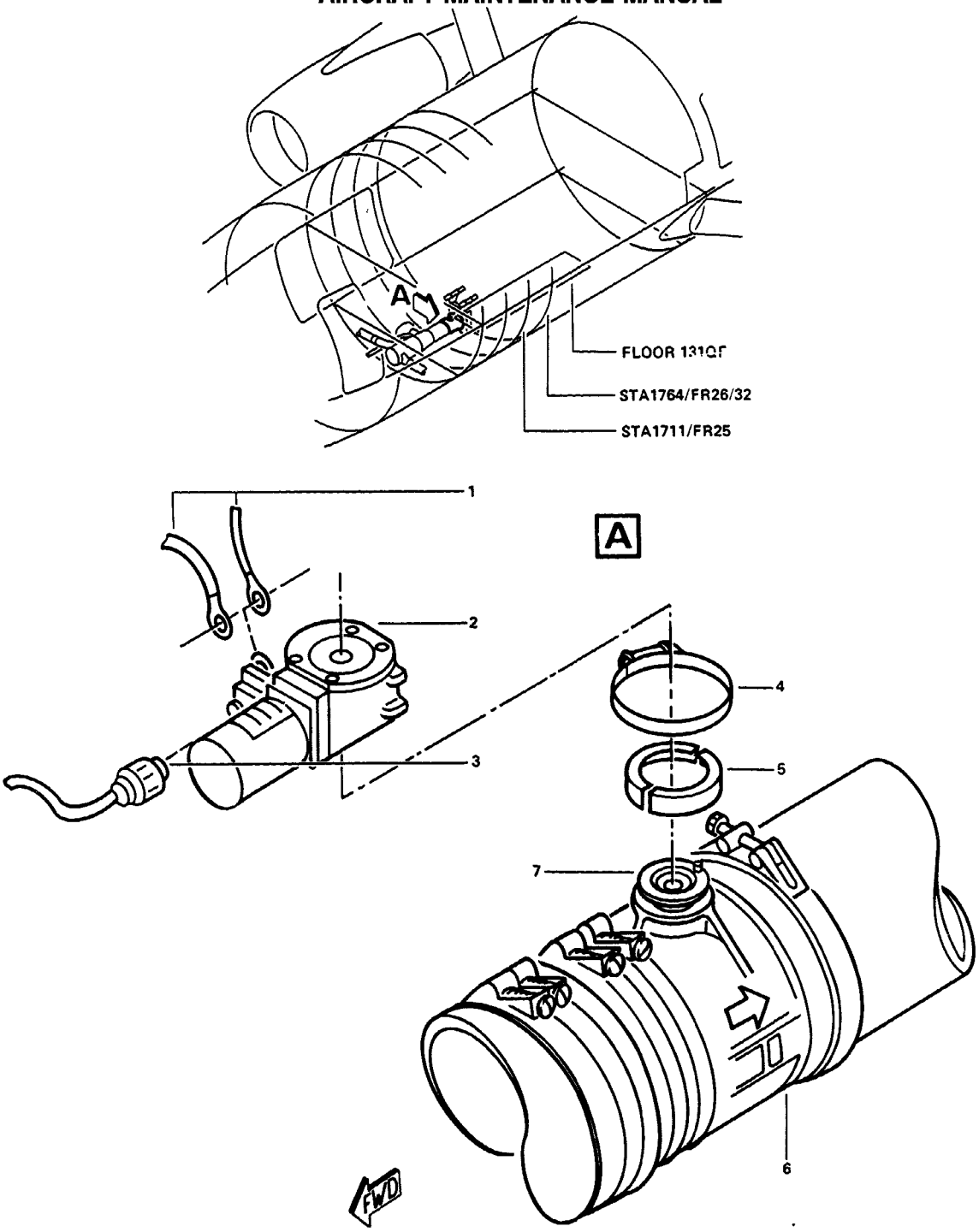
A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2 m (6 ft. 7 in.)
(2)	Blanking Plugs/Caps
(3)	Circuit Breaker Safety Clips

B. Procedure
(Ref. Fig. 402)
(1)Job set-up
(a)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
22VU	VENT/EXTRACT/FAN & VALVES/CTL	61HR	202/H20

(b)Position access platform.
(c)In forward cargo compartment, remove floor panel 131QF.
(2)Removal
(a)Disconnect bonding strips (1).
(b)Disconnect electrical connector (3) from actuator (2).
(c)Remove clamp (4) and the two half clamp rings (5).
(d)Remove actuator (2) from valve (6).
(e)Cap electrical connector (3).
(3)Installation
(a)Clean and inspect actuator interface and/or adjacent area.
(b)Remove blanking cap from electrical connector (3). Check for correct condition of clamp and electrical connector (3).
(c)Engage actuator (2) on valve (6) by lining up splines of actuator output shaft with splines in valve.
(d)Position actuator (2) to align locating pin (7) and hole in actuator.
(e)Make certain that surfaces of actuator and valve come into proper contact.
(f)Install the two half clamp rings (5). Install and tighten clamp (4).
(g)Remove blanking plugs from electrical connector and duct.
(h)Connect bonding strips (1) and electrical connector (3).
(i)Remove safety clip and tag and close circuit breaker 61HR:
(4)Test
Ref. paragraph 1.B.(4) above.
(5)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Install floor panel 131QF.
(c)Remove access platform.



Actuator
Figure 402

OVERBOARD EXTRACT VALVE (75HR) - REMOVAL/INSTALLATION

CAUTION : DE-ENERGIZE THE AIRCRAFT ELECTRICAL NETWORK (PROTECTION OF ELECTRIC AND ELECTRONIC COMPONENTS IN AVIONICS COMPARTMENT).

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2 m. (6 ft. 7 in.)
B.	Circuit Breaker Safety Clips
C.	Blanking Plugs/Caps
R D.	Seal

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 32-00-00, P. Block 501	Landing Gear

2. Procedure

A. Job Set-Up
(1)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
22VU	VENT/EXTRACT/FAN & VALVES/CTL	61HR	202/H20

(2)Position access platform.

B. For PN VST165
(Ref. Fig. 401)
(1)Removal
(a)Remove the 10 screws (2) and free valve (3).
(b)Disconnect electrical connector (1).
(c)Remove valve (3).
R (d)Remove and discard the seal (4).
R (e)Cap open end of duct (5) and electrical connector (1).

(2)Installation
(a)Clean and inspect valve interface and/or adjacent area.
(b)Remove blanking caps from duct (5) and electrical connector (1).
Check for correct condition of duct flange and electrical connector.
R (c)Install a new seal (4) on the valve (3).
R (d)Connect electrical connector (1).
R (e)Install valve (3) and secure with screws (2).
R (f)Remove safety clip and tag and close circuit breaker 61HR.

(3)Test
Initial conditions
- correct electrical power supply
- panel circuit breakers closed particularly those associated with

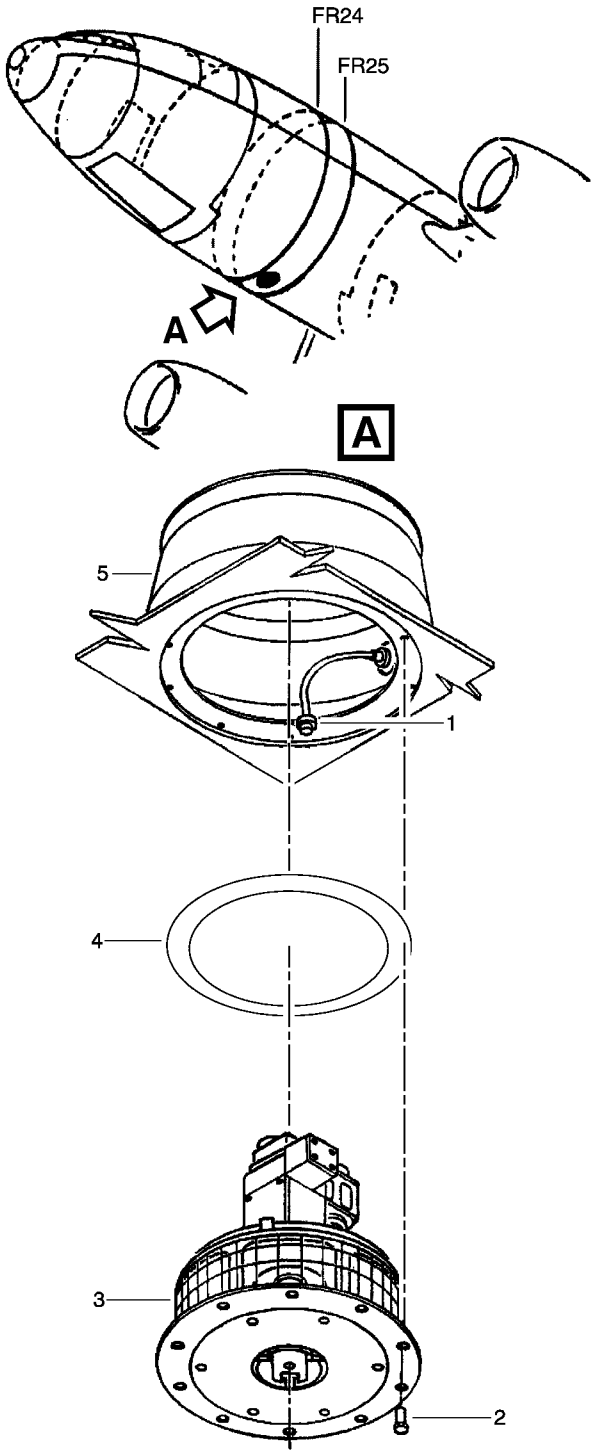
VENT/EXTRACT.

WARNING : PRIOR TO OPENING CIRCUIT BREAKER 119GB, TAKE THE APPROPRIATE SAFETY PRECAUTIONS (Ref. 32-00-00, P. Block 501).

ACTION	RESULT
	On VENT panel 438VU : - On OVBD VALVE/INBD annunciator, OVBD flowbar is on. Overboard extract valve is open (5 cm approx.).
1. On circuit breaker panel 133VU : - open LDG GEAR/PROX DET & RELAYS/ SYS 1/FLT/GND circuit breaker 119GB (location 332/U52)	Overboard extract valve closes. On panel 438VU, on OVBD VALVE/INBD annunciator : - OVBD flowbar goes off - INBD flowbar comes on.
2. On VENT panel 438VU : - release EXTRACT pushbutton switch	On panel 438VU : - OVBD legend on EXTRACT pushbutton switch comes on - on OVBD VALVE/INBD annunciator, OVBD flowbar comes on. Overboard extract valve is partially open (1 cm approx.).
- press EXTRACT pushbutton switch	Overboard extract valve closes. On panel 438VU : - OVBD legend on EXTRACT pushbutton switch goes off - INBD flowbar comes on and OVBD flowbar goes off on OVBD VALVE/ INBD annunciator.
3. On circuit breaker panel 128VU : - close circuit breaker 119GB	Overboard extract valve opens. On panel 438VU, on OVBD VALVE/ INBD annunciator : - INBD flowbar goes off - OVBD flowbar comes on.

(4)Close-Up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove access platform.
(c)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

B. For PN VF1620C00
(Ref. Fig. 402)
(1)Removal
(a)Remove the 10 screws (1) and free valve (4).
(b)Disconnect electrical connector (2) and bonding strip (3).



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Overboard Extract Valve (75HR)
Figure 401

R

(c)Remove valve (4).
R (d)Remove and discard the seal (5).
R (e)Cap open end of duct (6) and electrical connector (2).

(2)Installation
(a)Clean and inspect valve interface and/or adjacent area.
R (b)Remove blanking caps from duct (6) and electrical connector (2).
(c)Check for correct condition of duct flange and electrical connector.
R (d)Install a new seal (5) on the valve (4).
R (e)Secure bonding strip (3) and connect electrical connector (2).
R (f)Install valve (4) and secure with screws (1).
NOTE : The overboard extract valve must be installed with the manual handle on the rearward side.
R (g)Remove safety clip and tag and close circuit breaker 61HR.

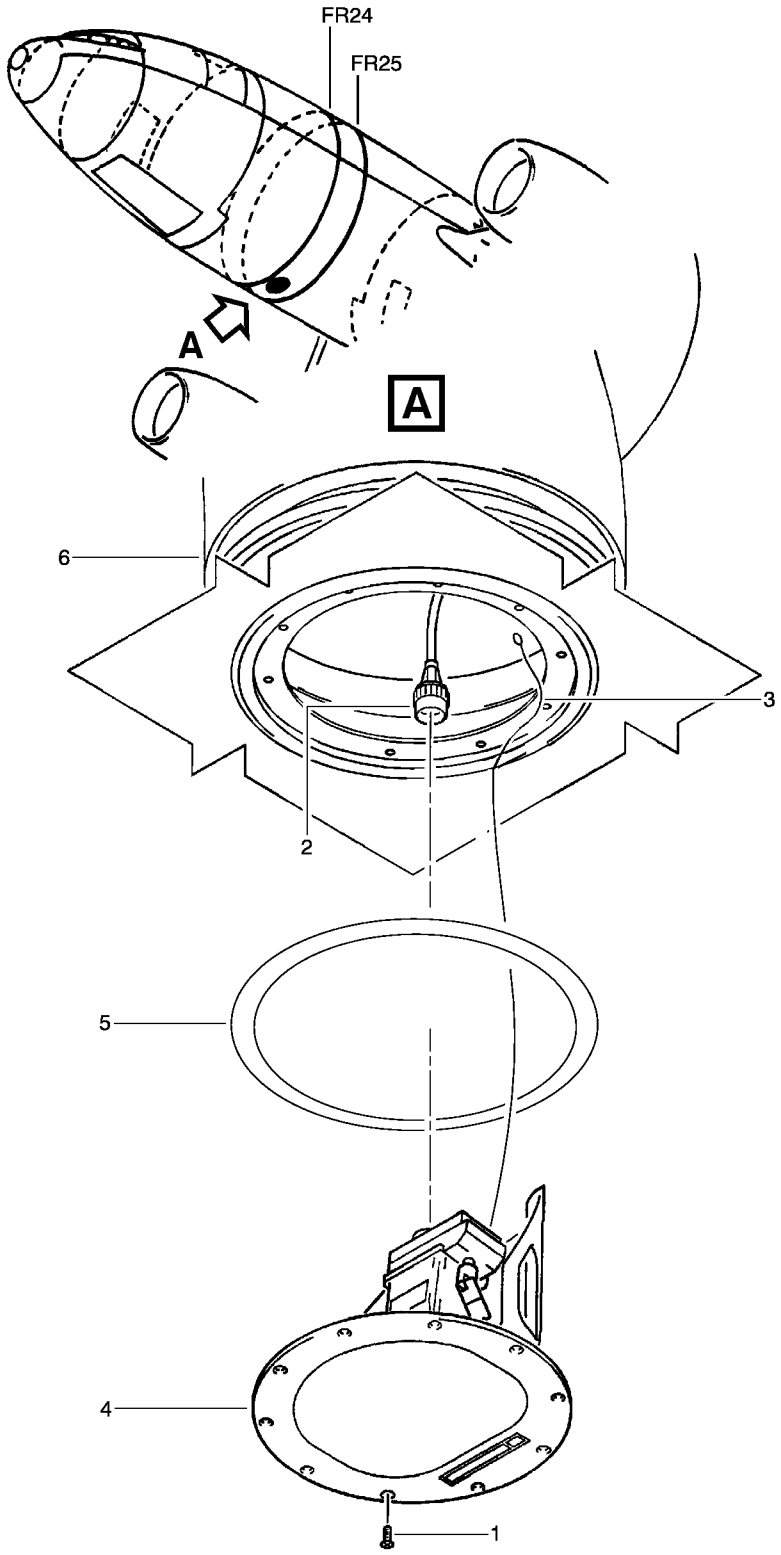
(3)Test
Initial conditions
- correct electrical power supply
- panel circuit breakers closed particularly those associated with VENT/EXTRACT.

WARNING : PRIOR TO OPENING CIRCUIT BREAKER 119GB, TAKE THE APPROPRIATE SAFETY PRECAUTIONS (Ref. 32-00-00, P. Block 501).

ACTION	RESULT
	On VENT panel 438VU : - On OVBD VALVE/INBD annunciator, OVBD flowbar is on. Overboard extract valve is open.
1. On circuit breaker panel 133VU : - open LDG GEAR/PROX DET & RELAYS/ SYS 1/FLT/GND circuit breaker 119GB (location 332/U52)	Overboard extract valve closes. On panel 438VU, on OVBD VALVE/INBD annunciator : - OVBD flowbar goes off - INBD flowbar comes on.
2. On VENT panel 438VU : - release EXTRACT pushbutton switch	On panel 438VU : - OVBD legend on EXTRACT pushbutton switch comes on - on OVBD VALVE/INBD annunciator, OVBD flowbar comes on. Overboard extract valve is partially open.
- press EXTRACT pushbutton switch	Overboard extract valve closes. On panel 438VU : - OVBD legend on EXTRACT pushbutton switch goes off - INBD flowbar comes on and OVBD flowbar goes off on OVBD VALVE/ INBD annunciator.
3. On circuit breaker panel 128VU : - close circuit breaker 119GB	Overboard extract valve opens. On panel 438VU, on OVBD VALVE/

ACTION	RESULT
	INBD annunciator : - **INBD** flowbar goes off - **OVBD** flowbar comes on.

(4)Close-Up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove access platform.
(c)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).



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Overboard Extract Valve (75HR)
Figure 402

R

OVERBOARD EXTRACT VALVE - DEACTIVATION/REACTIVATION

REF. : MEL Sect. 1-21, Item 46
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.

1. Deactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
Referenced Procedure - TSM 21-20-00	Flight Compartment and Electronics Racks Air Distribution, Electronics Racks Air Extraction Smoke or Burning Smells in Cabin

B. Procedure for PN VST165

(1)Job set-up

(a)On VENT panel 438VU
- make certain that EXTRACT pushbutton switch is released (OVBD legend on).

(b)Both air conditioning packs are operative.

(c)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	EXTRACT FAN & VALVES WARN	60HR	H19
22VU	EXTRACT FAN & VALVES CTL	61HR	H20

(2)Removal

(a)Press pushbutton switch to release manual control handle (Ref. Fig. 901).

(b)Turn manual control handle counterclockwise to open the valve until intermediate position is reached 7.5 mm + 0 mm/- 2 mm (0.2952 + 0 in./- 0.0787 in.).

(c)Remove the 10 screws and free valve.

R (d)Disconnect electrical connector.

(e)Cap electrical connector.

(f)Stow electrical cable and connector and secure with tape.

(g)Install valve and secure with screws.

(h)Open valve until intermediate position is reached.

(3)Close-up

(a)Remove safety clips and tags and close circuit breakers 60HR and 61HR.

(b)Make an entry in the aircraft technical log.

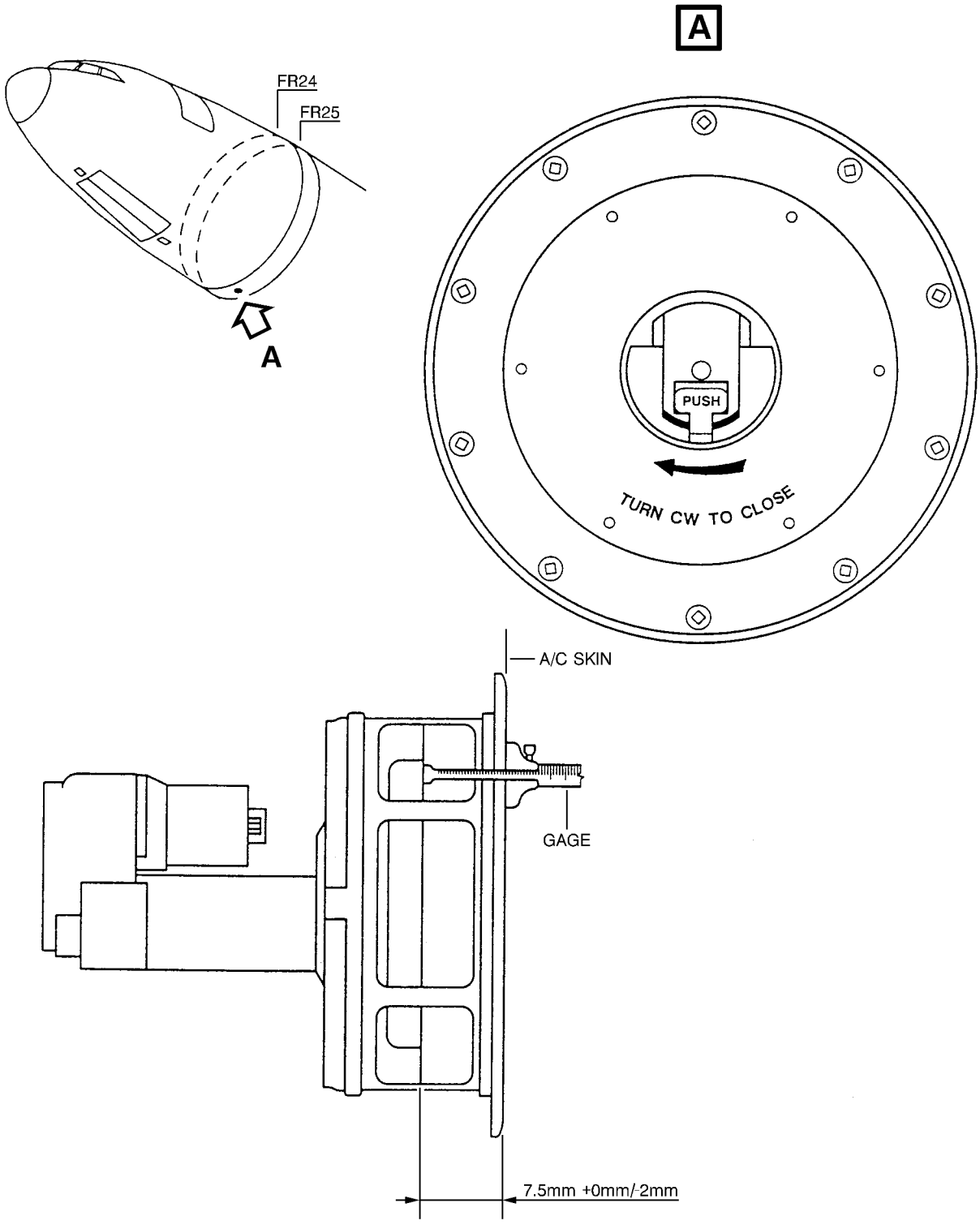
B. Procedure for PN VF1620C00

R WARNING : DO NOT USE YOUR FINGERS TO SET THE SWITCH TO THE "ON" POSITION. USE A STICK, AND BE VERY CAREFUL.

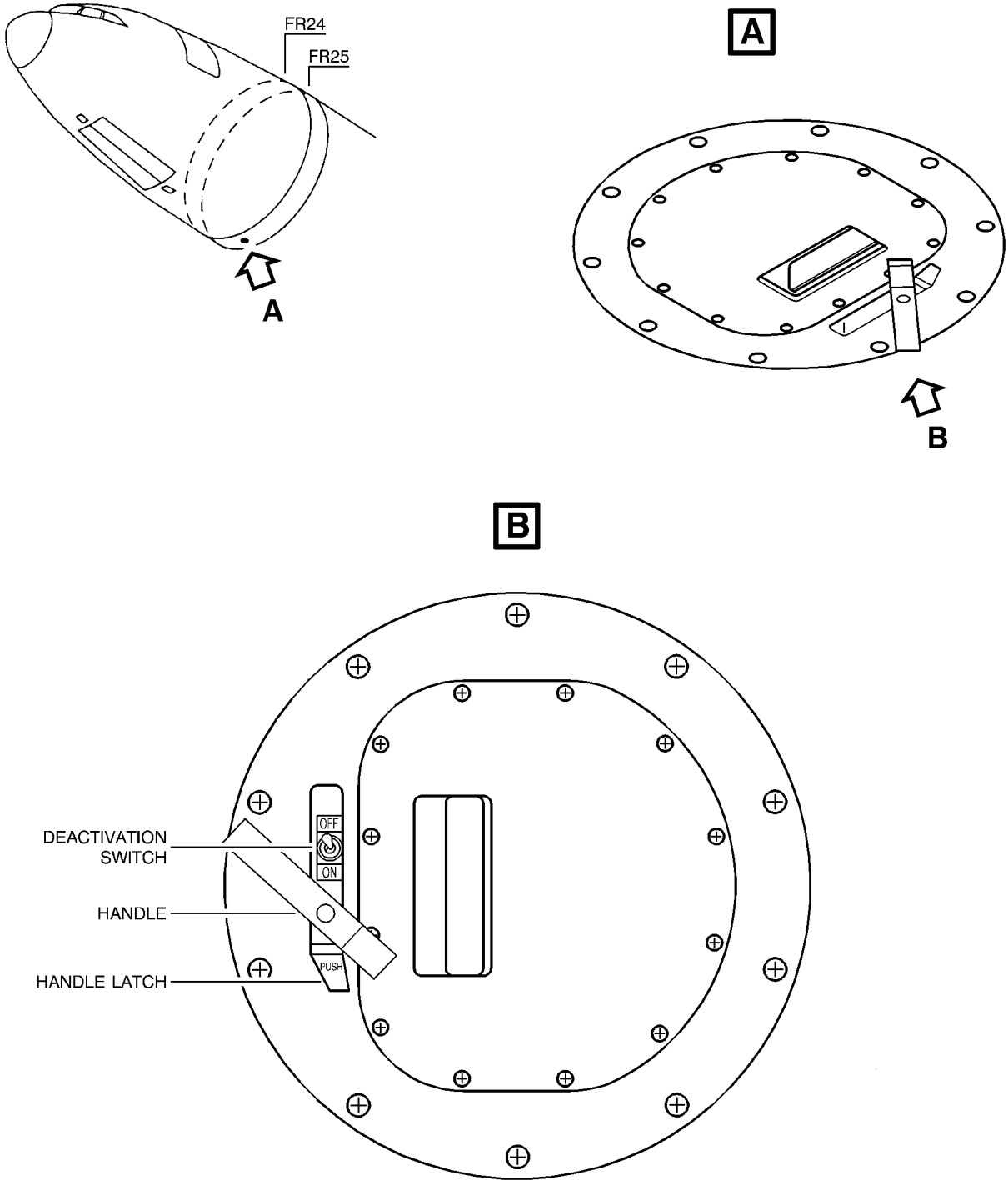
(1)Job set-up
  (a)On VENT panel 438VU :
     - make certain that EXTRACT pushbutton switch is released
       (OVBD legend on).
  (b)Put a warning notice to tell persons not to operate this
     pushbutton switch.
  (c)Both air conditioning packs are operative.

(2)Removal
  (a)Push PUSH latch to release handle (Ref. Fig. 902).
  (b)Pull handle but do not engage mechanism.
  (c)Set deactivation switch to OFF.
  (d)Pull handle to engage mechanism.
  (e)Fold out handle.
  (f)Turn handle counterclockwise to fully close the main flap of the valve.
     NOTE : When the main flap is closed, the auxiliary flap closes
            if you continue to turn the handle counterclockwise.
  (g)Make certain that the auxiliary flap is in the open position.
  (h)Fold and latch handle.

(3)Close-up
  (a)Make an entry in the aircraft technical log.



Overboard Extract Valve
Opening Measurement
Figure 901



Overboard Extract Valve
Figure 902

2. Reactivation

A. Procedure for PN VST165

(1)Job set-up

(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	EXTRACT FAN & VALVE WARN	60HR	H19
22VU	EXTRACT FAN & VALVE CTL	61HR	H20

(2)Installation

(a)Press pushbutton switch to release manual control handle (Ref. Fig. 901).

(b)Turn manual control handle counterclockwise to open the valve until intermediate position is reached 7.5 mm + 0 mm/- 2 mm (0.2952 + 0 in./- 0.0787 in.).

(c)Remove the 10 screws and free valve.

(d)Remove blanking cap from electrical connector.

(e)Connect electrical connector.

(f)Install valve and secure with screws.

(g)Turn manual control handle clockwise to close the valve.

(h)Remove safety clips and tags and close circuit breakers 60HR and 61HR.

(j)On VENT panel 438VU :

- press EXTRACT pushbutton switch (OVBD legend goes off).

(3)Troubleshoot the system (Ref. TSM 21-20-00).

R (4)Close-up

R (a)Clear the technical log.

A. Procedure for PN VF1620C00

WARNING : DO NOT USE YOUR FINGERS TO SET THE SWITCH TO THE "ON" POSITION. USE A STICK, AND BE VERY CAREFUL.

(1)Installation

(a)Push PUSH latch to release handle (Ref. Fig. 902).

(b)Pull handle but do not engage mechanism.

(c)Make certain that deactivation switch is in OFF position.

(d)Pull handle to engage mechanism.

(e)Fold out handle.

(f)Push handle to disengage mechanism but keep access to switch.

(g)Set deactivation switch to ON.

(h)Push handle fully and latch it.

(j)On VENT panel 438VU

- press EXTRACT pushbutton switch (OVBD legend goes off).

(2)Troubleshoot the system (Ref. TSM 21-20-00).

(3)Close-up

(a)Clear technical log.

(b)Remove warning notice.

R AIRFLOW DETECTOR (72HR) - REMOVAL/INSTALLATION
R

CAUTION : DE-ENERGIZE THE AIRCRAFT ELECTRICAL NETWORK (PROTECTION OF ELECTRIC AND ELECTRONIC COMPONENTS IN AVIONICS COMPARTMENT).

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2 m (6 ft. in.)
B.	Torque Wrench 0.6 m.daN (53 lbf. in.)
C.	O-Ring
D.	Blanking Plugs/caps
E.	Circuit Breaker Safety Clips
Referenced Procedures	
- 32-00-00, P. Block 501	Landing Gear
- 24-41-00, P. Block 301	AC External Power Control

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

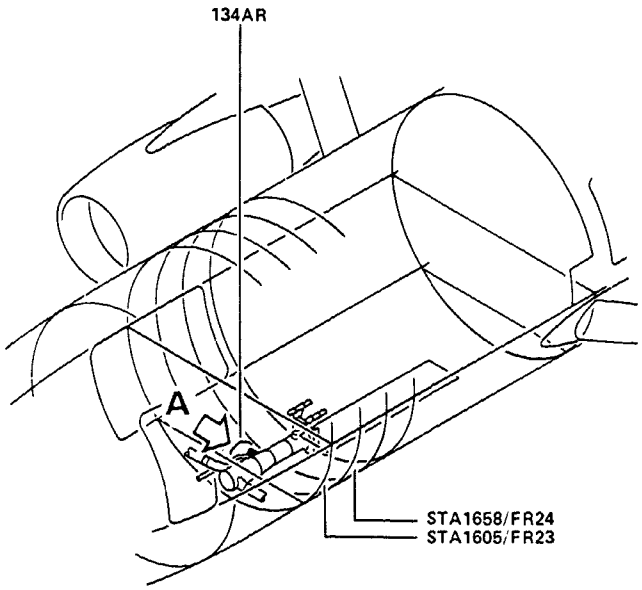
PANEL	SERVICE	IDENT.	LOCATION
22VU	VENT/EXTRACT/FAN&VALVES/WARN	60HR	202/H19
22VU	VENT/EXTRACT/FAN&VALVES/CTL	61HR	202/H20

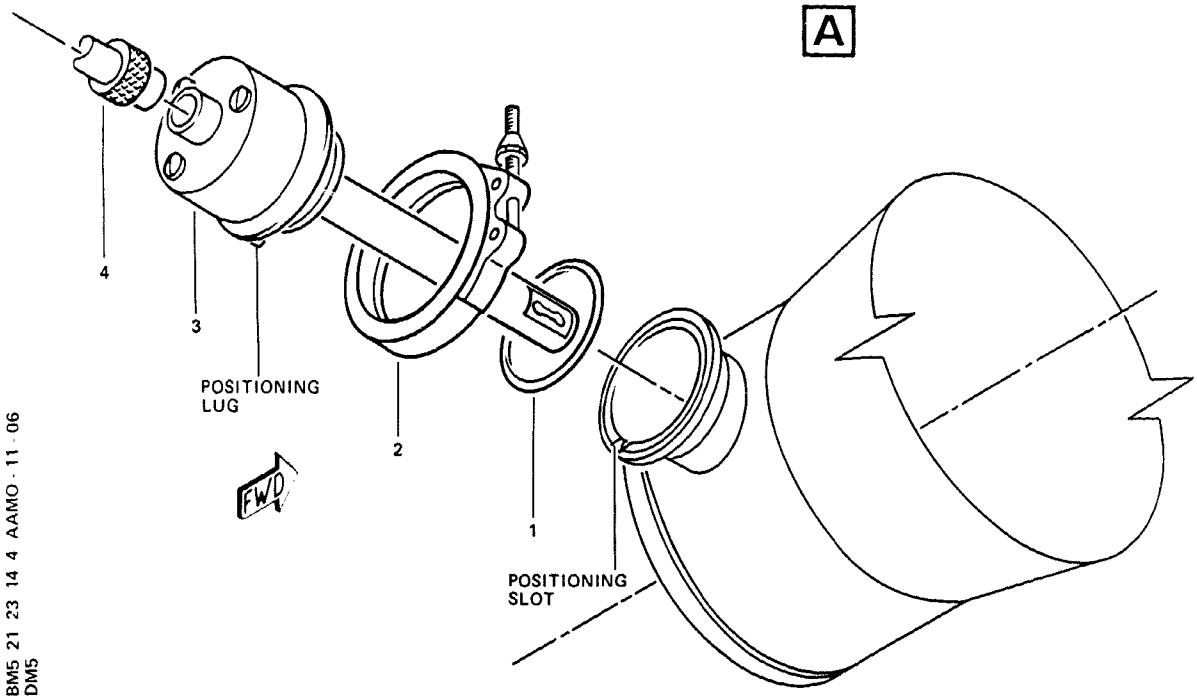
(2)Position access platform.
(3)Remove access door 134AR.

B. Removal
(1)Disconnect electrical connector 72HR-A (4).
(2)Remove clamp (2) and airflow detector (3). Discard O-ring (1).
(3)Cap open duct and electrical connector (4).

C. Installation
(1)Remove blanking caps from duct and electrical connector (4). Check for correct condition of duct flange and electrical connector (4).
(2)Clean and inspect airflow detector interface and/or adjacent area.
(3)Install new O-ring (1) in groove in duct flange.
(4)Install airflow detector (3) paying attention to positioning lug and clamp (2). TORQUE nut to value given on clamp.
(5)Connect electrical connector (4) to airflow detector (3).
(6)Remove safety clips and tags and close circuit breakers 60HR and 61HR.

D. Test
Initial Conditions





Airflow Detector (72HR)
Figure 401

- correct electrical power supply
- panel circuit breakers closed particularly those associated with **VENT/EXTRACT** and **LDG GEAR**.

WARNING : PRIOR TO OPENING CIRCUIT BREAKER 119GB, TAKE THE APPROPRIATE SAFETY PRECAUTIONS (Ref. 32-00-00, P. Block 501).

ACTION	RESULT
	On **VENT** panel **438VU**, on **OVBD VALVE/INBD** annunciator - **OVBD** flowbar is on.
1. On circuit breaker panel **131VU** R - open **VENTILATION/EXTRACT FAN HI SPD** circuit breaker **63HR** (location **311/H64**)	Extract fan (**73HR**) stops operating After 3 min 20 sec. approx. . On **VENT** panel **438VU** - **FLOW** legend **EXTRACT** pushbutton switch comes on. . In nose landing gear well - horn is activated. **NOTE** : Switch off horn using **RESET** pushbutton switch on interphone box located in nose landing gear well as soon as horn is activated. After 12 seconds approx. . On **CAPT** and **F/O** main instrument panels **3VU** and **5VU** - **MASTER CAUTION** lights come on. . Aural warning : single chime. . On **L ECAM** display unit, the following message is displayed **AIR** **VENT EXTRACT LO FLOW** **VENT EXTRACT ---- OVBD**
2. On circuit breaker panel **133VU** - open **LDG GEAR/SYS1/FLT/GND** circuit breaker **119GB** (location **332/U52**)	Extract fan operates at low speed. Overboard extract valve closes. Inboard extract valve opens. On **VENT** panel **438VU** - On **OVBD VALVE/INBD** annunciator, **INBD** flowbar comes on and **OVBD** flowbar goes off. - **FLOW** legend on **EXTRACT** pushbutton switch goes off. On **CAPT** and **F/O** main instrument panels **3VU** and **5VU** - **MASTER CAUTION** lights go off. On **L ECAM** display unit, message

ACTION	RESULT
	disappears.
- open **LDG GEAR/PROX DET & RELAYS/SYS2/FLT/GND** circuit breaker **1GB**	- No change
3. On circuit breaker panel **131VU** R - close circuit breaker **63HR**	No change
4. On circuit breaker panel **22VU** - open **VENT/EXTRACT/FAN SUPPLY LO SPD** R circuit breaker **62HR** (location 202/ H22)	Extract fan stops operating. After 3 min 20 sec. approx. . On **VENT** panel **438VU** - **FLOW** legend on **EXTRACT** pushbutton switch comes on. After 12 seconds approx. . On **CAPT** and **F/O** main instrument panels **3VU** and **5VU** - **MASTER CAUTION** lights come on. . Aural warning : single chime. . On **L ECAM** display unit, the following message is displayed **AIR** **VENT EXTRACT LO FLOW** - **VENT EXTRACT ....OVBD**
5. On **VENT** panel **438VU** - release **EXTRACT** pushbutton switch	On **VENT** panel **438VU** - on **EXTRACT** pushbutton switch, **OVBD** legend comes on. - on **OVBD VALVE/INBD** annunciator, **OVBD** flowbar comes on. Inboard extract valve closes. Overboard extract valve moves to the partially open position.
6. On circuit breaker panel **22VU** - close circuit breaker **62HR**	Extract fan starts operating at low speed. On panel **438VU** - **FLOW** legend on **EXTRACT** pushbutton switch goes off. On **CAPT** and **F/O** main instrument panels **3VU** and **5VU** - **MASTER CAUTION** lights go off. On **L ECAM** display unit, message disappears. On **L ECAM** display unit, message disappears
7. On **VENT** panel **438VU** - press **EXTRACT** pushbutton switch	Inboard extract valve opens. Overboard extract valve closes.

ACTION	RESULT
	On **VENT** panel **438VU** - **OVBD** legend on **EXTRACT** pushbutton switch goes off - on **OVBD VALVE/INBD** annunciator, **INBD** flowbar comes on and **OVBD** flowbar goes off.
8. On circuit breaker panel **133VU** - close circuit breaker **1GB** - close circuit breaker **119GB**	No change. - extract fan operates at high speed - overboard extract valve opens - inboard extract valve closes. On panel **438VU** - on **OVBD VALVE/INBD** annunciator, **OVBD** flowbar comes on and **INBD** flowbar goes off.

E. Close-Up
(1) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3) Install access door **134AR**.
(4) Remove access platform.

BATTERIES VENTILATION - DESCRIPTION AND OPERATION

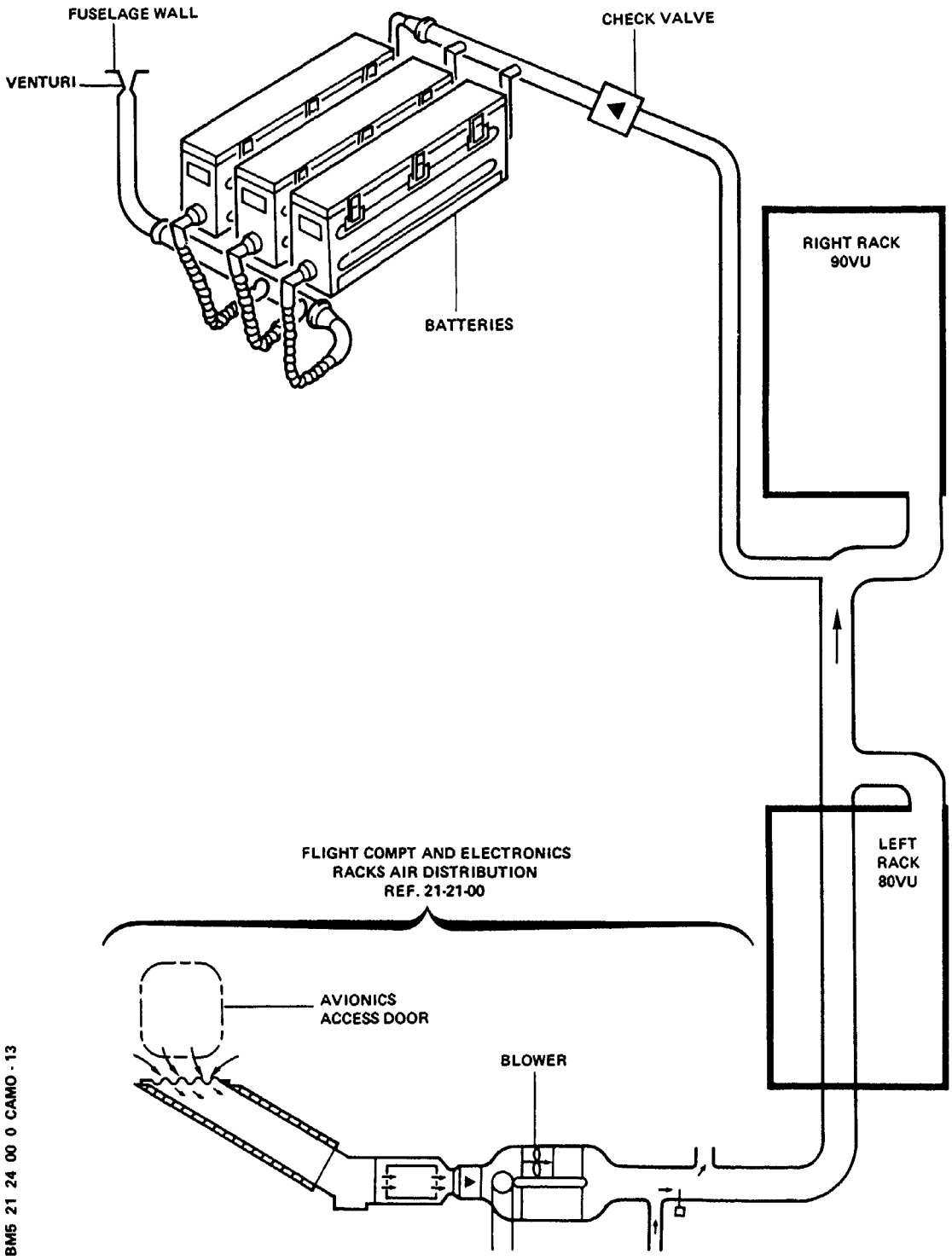
1. General

The batteries are ventilated by air extracted from the electronics racks air distribution system. Air is blown across the batteries and then directly discharged overboard.

2. Description

(Ref. Fig. 001)

The batteries are cooled by air extracted from the electronics racks air blowing system (Ref. 21-21-00). From the batteries, air is evacuated overboard through a check valve and a venturi which is installed on the fuselage wall.



Batteries Ventilation - Airflow Diagram
Figure 001

R BATTERIES VENTILATION CHECK VALVE - REMOVAL/INSTALLATION

R 1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs/Caps

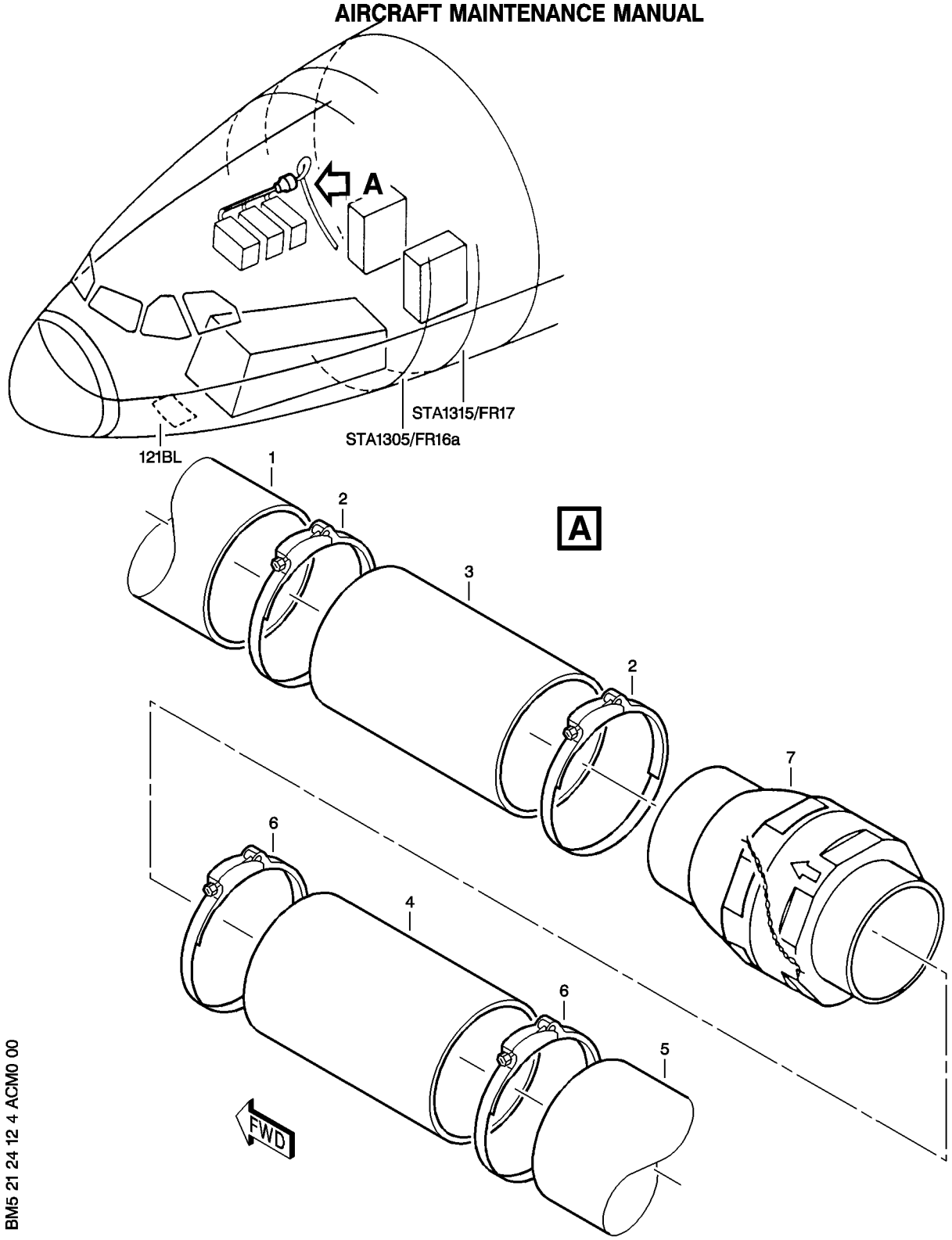
R 2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open avionics compartment access door 121BL.

B. Removal
(1)Remove clamps (2) from flexible sleeve (3).
(2)Slide flexible sleeve (3) onto duct (1).
(3)Remove clamps (6) from flexible sleeve (4).
(4)Remove check valve (7).
(5)Cap open ends of ducts (1) and (5).

C. Installation
(1)Remove blanking plugs/caps from ducts (1) and (5) and check for correct condition of ducts.
(2)Clean check valve interface and/or adjacent area.
(3)Install check valve (7) between ducts (1) and (5) with arrow indicating airflow direction pointing forward.
(4)Install flexible sleeve (3) on check valve (7).
(5)Install and tighten clamps (2).
(6)Install flexible sleeve (4) on check valve (7).
(7)Install and tighten clamps (6).

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 121BL.



Batteries Ventilation Check Valve
Figure 401

R

CHECK VALVE - INSPECTION/CHECK

CAUTION : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Reason for the Job

R Check for wear and freedom of flap of check valve.

2. Equipment and Materials

ITEM	DESIGNATION
A. Material No. 11-003	Cleaning Agents (Ref. 20-31-00)
Referenced Procedure - 21-24-12, P. Block 401	Check Valve

3. Procedure

A. Job Set-Up

R (1)In zone 122, remove check valve (Ref. 21-24-12, P. Block 401).
(2)Clean check valve with Material No. 11-003.

R B. Check

R (1)Check condition of check valve.
R (a)Check condition of check valve, especially flap and its seating, hinge pin and tension spring.
R (b)Manually operate flap and check that it moves freely throughout travel range and seats correctly.

C. Close-Up

(1)Install check valve (Ref. 21-24-12, P. Block 401).

INDIVIDUAL AIR DISTRIBUTION - DESCRIPTION AND OPERATION

1. General

R **ON A/C 001-100,

(Ref. Fig. 001)

R **ON A/C 101-200,

(Ref. Fig. 002)

R **ON A/C 001-100,

A. In each cabin zone main supply duct, upstream from the fresh and circulated air mixing point, fresh air is tapped and ducted to individual air outlets located under the lateral and central overhead stowage compartments.

B. The individual air outlets are positioned above each passenger, and are adjustable in both flowrate and direction.

R **ON A/C 101-200,

R A. In each cabin zone main supply duct, upstream of the fresh and circulated
R air mixing point, fresh air is tapped and ducted to individual air outlets
R for each passenger. The outlets are located under the lateral and central
R overhead stowage compartments and are adjustable to modulate flowrate and
R direction.

R B. The individual air outlets, for the cabin attendant stations
R are supplied by the galley and lavatory ventilation. The individual air
R outlets are located in the sidewalls and doorlinings and are adjustable
R to modulate flowrate and direction of the airflow.

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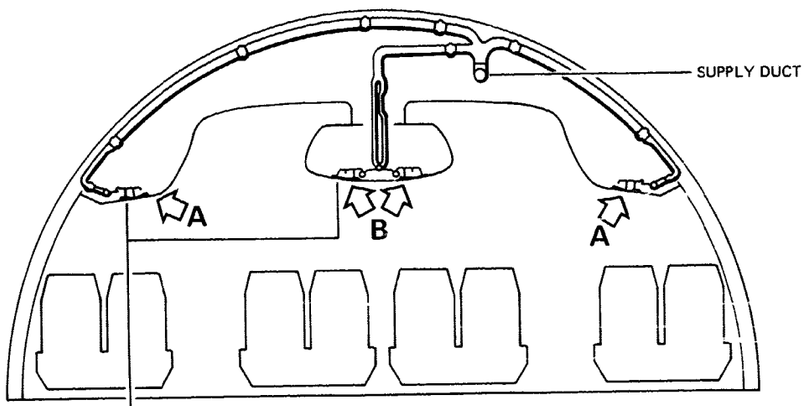
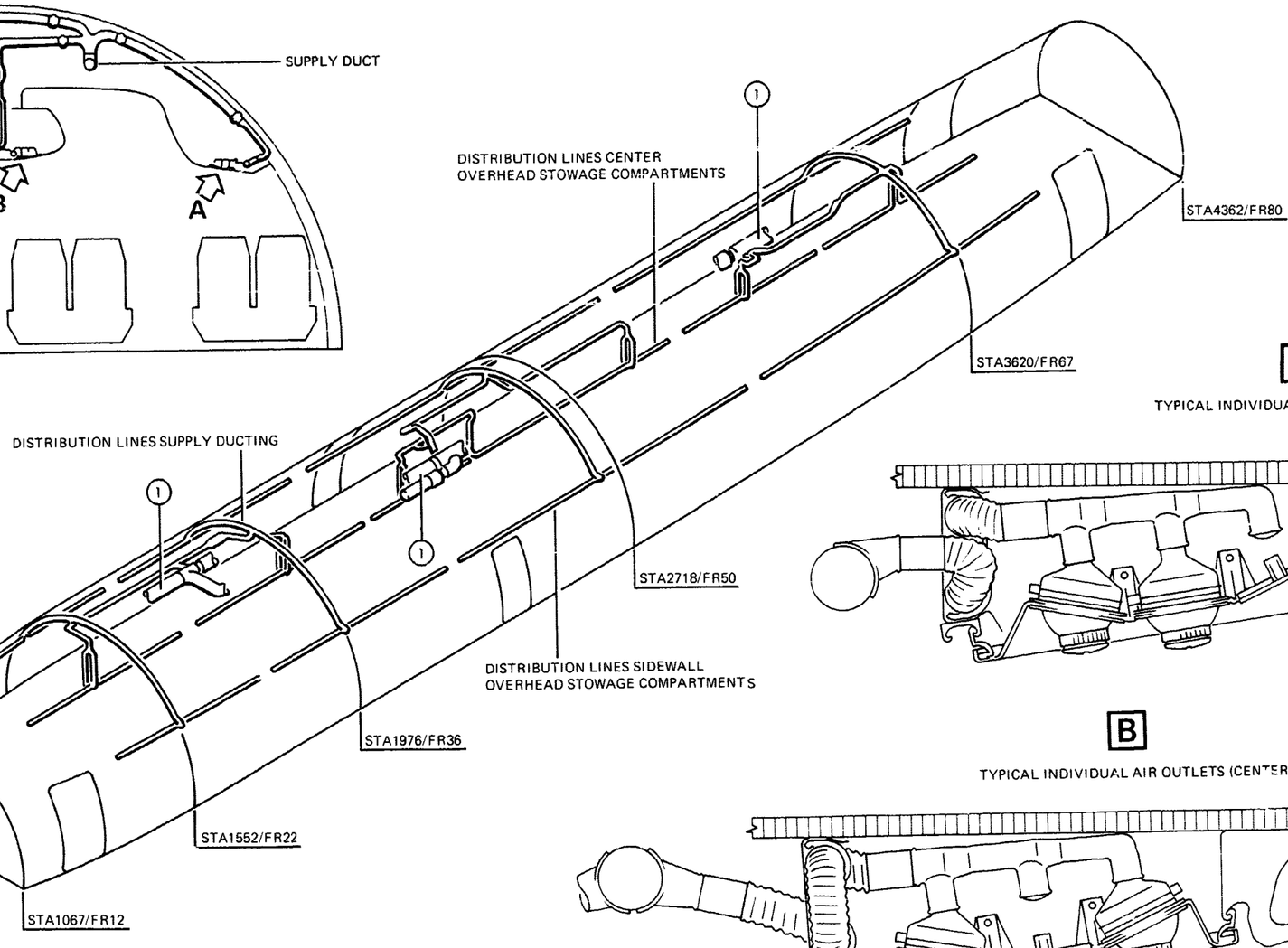
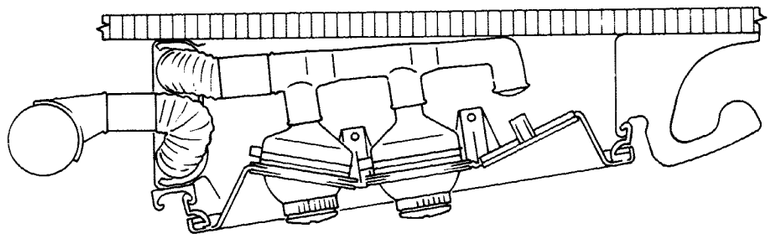
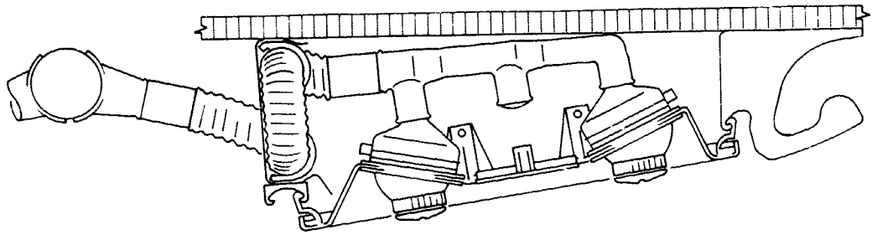






A

TYPICAL INDIVIDUAL AIR OUTLETS (SIDEWALL)



B

TYPICAL INDIVIDUAL AIR OUTLETS (CENTER)

(1) MAIN CABIN AIR SUPPLY DUCTING

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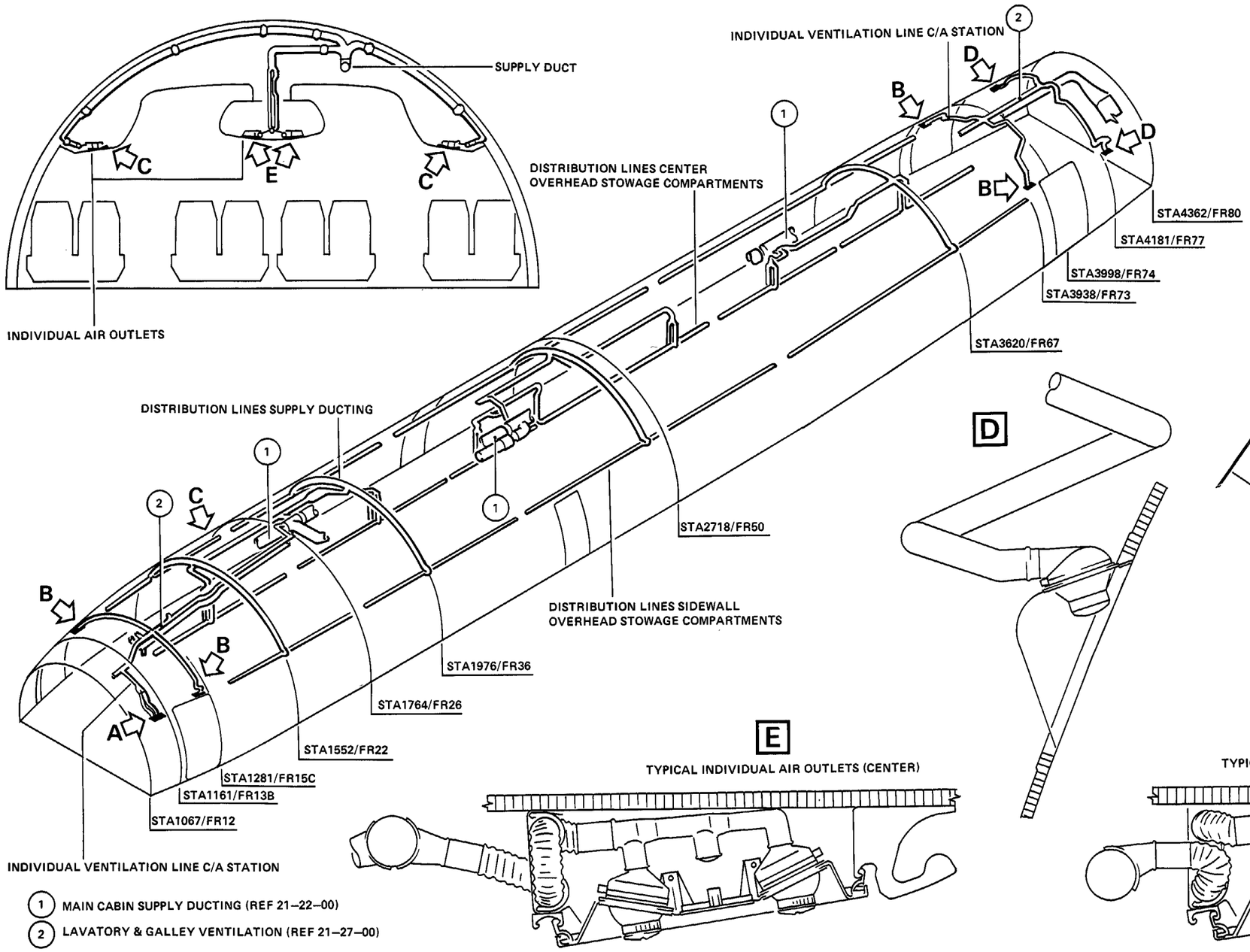
Individual Ventilation
Figure 001



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Individual Ventilation
Figure 002

1. Equipment and Materials

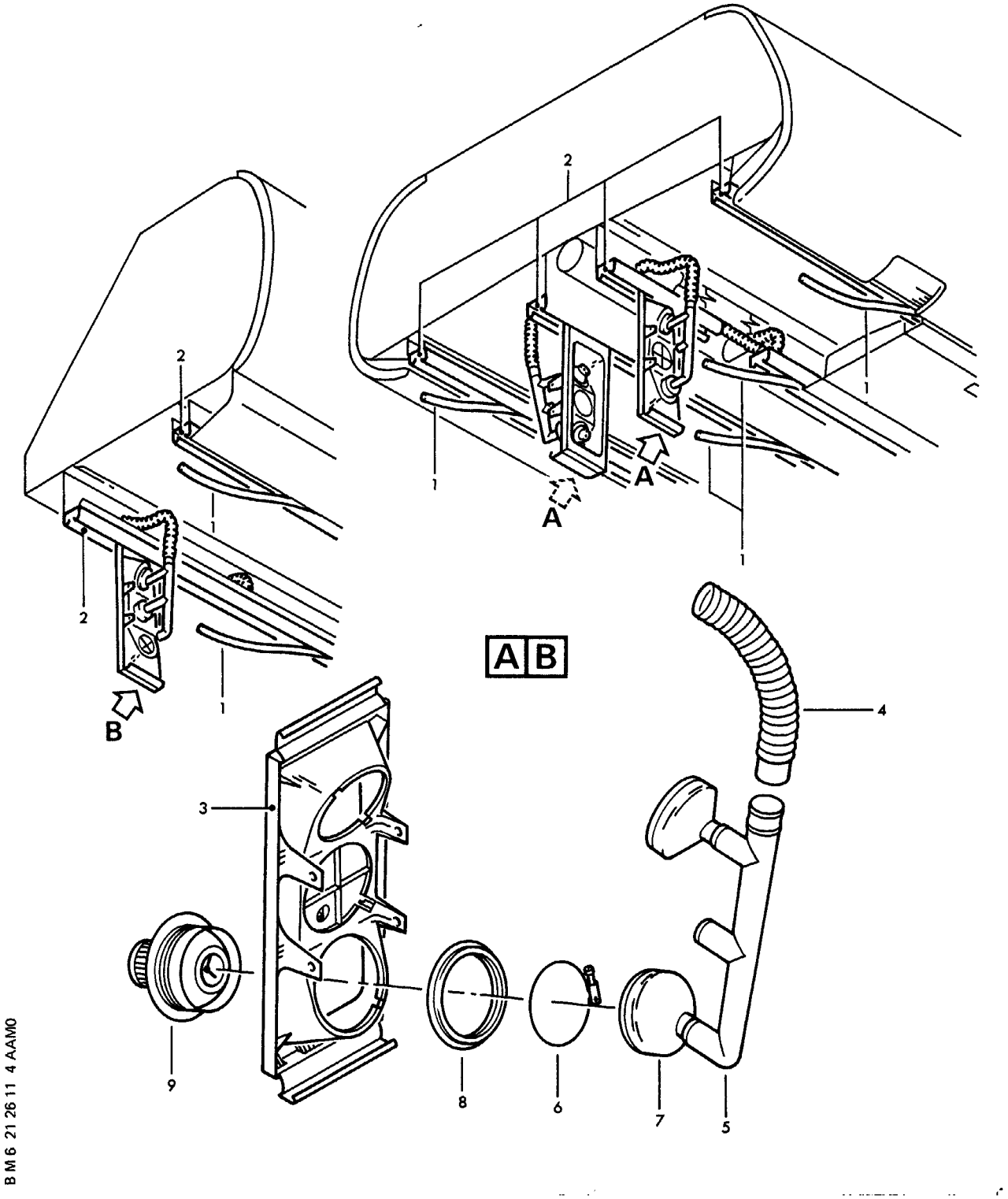
ITEM	DESIGNATION
A. 98A25207503000	Pulley Assembly - Sealing Cord
B.	Blanking Caps

2. Procedure
(Ref. Fig. 401)

A. Removal
(1)Remove mounting seals (1) from service rails (2).
(2)Disengage and lower one side of air outlet panel (3) from service rail.
(3)Disengage and cap hose (4) from manifold (5).
(4)Remove air outlet panel from service rail.
(5)Loosen clamps (6) and remove manifold with caps (7).
(6)Mark top surface of ring nut (8), remove ring nut and air outlet (9) from panel.

B. Installation
(1)Position air outlet (9) and secure with ring nut (8). Hand tighten ring nut.
NOTE : Install ring nut with marked surface exposed. If ring nut is installed upside down, nozzle will rattle with ring nut hand tightened.
(2)Install manifold (5) with caps (7) and secure with clamps (6).
(3)Correctly position air outlet panel and attach one side to service rail (2).
(4)Remove cap and engage hose (4) on to manifold (audible click).
(5)Raise air outlet panel and secure to service rail.
(6)Position mounting seals (1) into service rails (2).
(7)Roll in mounting seals by moving pulley assembly P/N 98A25207503000 backwards and forwards.
NOTE : Rolling in mounting seals in one direction only causes them to contract. In this case panels are not fitted correctly.
Make certain that abutments of mounting seals do not align with joints between panels.

C. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.



Air Outlet Panel - Typical
Figure 401

1. General
(Ref. Fig. 001)
The lavatories and galleys are equipped with a ventilation system with ambient air being supplied from the cabin and fresh air, through individual outlets, being supplied by tappings in the cabin distribution ducting. Air extracted from the lavatory and galley units is exhausted overboard via a duct system separate from the cabin air to eliminate unpleasant odors entering the cabin.

2. Component Location
(Ref. Fig. 002)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
5HU	FAN-EXTRACTION		171	162AZ	21-27-11
6HU	RELAY-FAN POWER	282VU	122	121BL	
7HU	RELAY-FAILURE CONTROL	282VU	122	121BL	
8HU	SWITCH-DIFFERENTIAL PRESSURE		121	121BL	21-27-14
13HU	MFA-LAV & GALLEY	472VU	212		

3. System Description
(Ref. Fig. 001)

A. Lavatory and Galley Air Supply
Conditioned air is supplied to each lavatory and selected galleys by tapping the cabin distribution ducts. Restrictors are installed in the supply ducts downstream from the tapping points to raise the pressure level for correct functioning of the individual air outlets. The airflow is adjustable in both quantity and direction. The lavatory outlets are positioned immediately below the mirror. The majority of air supplied to the lavatories and galleys is ambient cabin air drawn into the units by suction created by the extraction airflow.

B. Lavatory and Galley Extraction System
Air is extracted from the lavatories and galleys through a duct positioned above the cabin ceiling panels. This duct extends the length of the cabin from the forward utility area, left of center, rearwards, to a point above the left hand aft lavatories between frames 78 and 79, and then following the fuselage contour downwards, ending in a venturi in the aft cabin underfloor area aft of the bulk cargo compartment. The venturi function is to limit the air flow through the system to the defined level during flight.

The extraction duct is manufactured from resin and glassfiber laminate and composed of several interconnected sections. Capped branches along the duct allow for installation of lavatories and galleys in various locations throughout the cabin.

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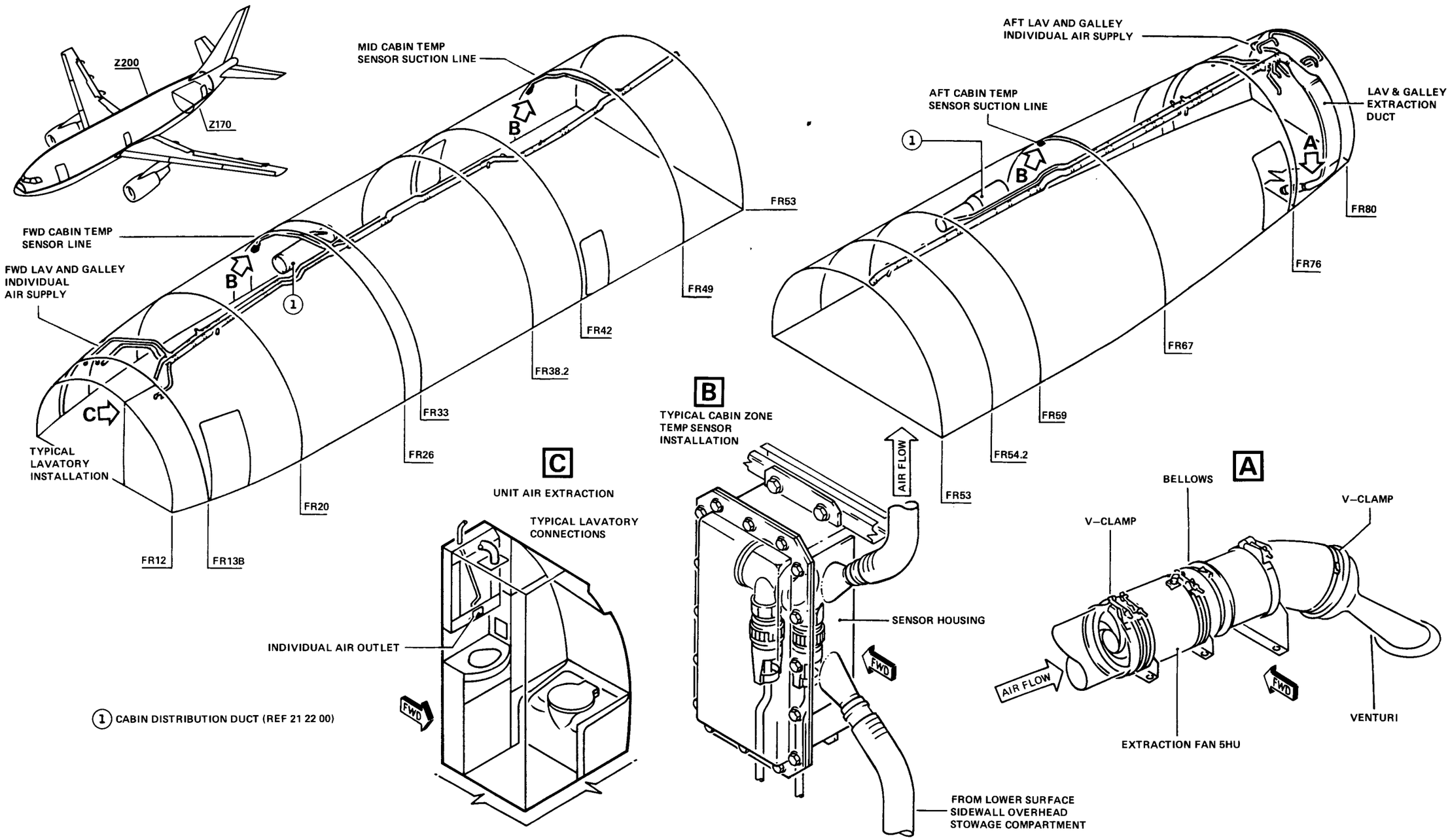

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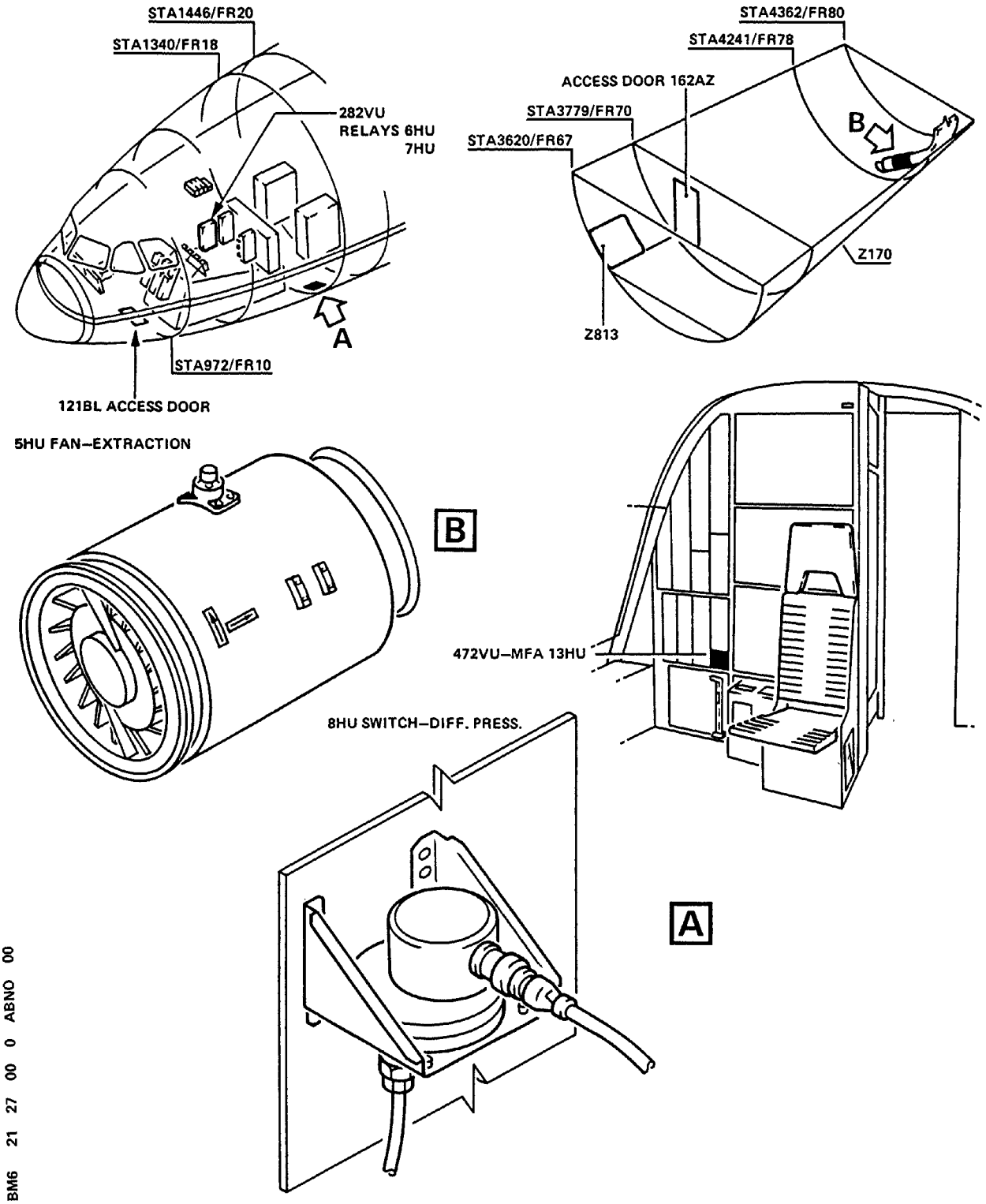
General System Layout
Figure 001

R



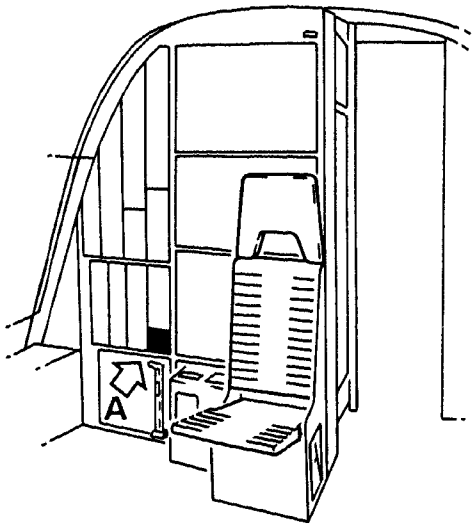
Lav & Galley Vent Components
Figure 002

In each of the cabin distribution zones, the temperature sensors are installed in a housing located in the area above the RH overhead stowage compartments. Cabin air is drawn from an opening between the stowage compartments, up a flexible tube to the housing, circulated around the sensor elements and out to the main extraction duct via another flexible tube. Cabin differential pressure provides for extraction airflow when the aircraft is in flight while an extraction fan is automatically activated when the aircraft is on the ground, or in flight when differential pressure is less than 1 psi.

C. Controls and Indicators
(Ref. Fig. 003)
A LAV & GALLEY memorized fault annunciator light is provided in the FANS MONITOR section of the maintenance panel to indicate a malfunction of the fan.

4. Component Description

A. Extraction Fan 5HU
(Ref. Fig. 004)
The lavatory and galley extraction fan consists of a three-phase squirrel cage induction motor that drives a cast aluminum fan wheel having eighteen high-efficiency blades. The fan is designed for continuous operation at a rotational speed of approximately 11,500 rpm. Thermo switches, fitted to the fan motor stator, isolate the power supply to the motor if the stator temperature reaches 90 °C (194 °F).
The fan is secured by clamps to brackets on the aircraft structure in the Aft Cabin Underfloor Compartment, Zone 171. Arrows on the fan casing denote direction of rotation and airflow direction. The inlet end of the fan casing is connected by a V-clamp to the extraction duct. A bellows connects the fan to the venturi section.



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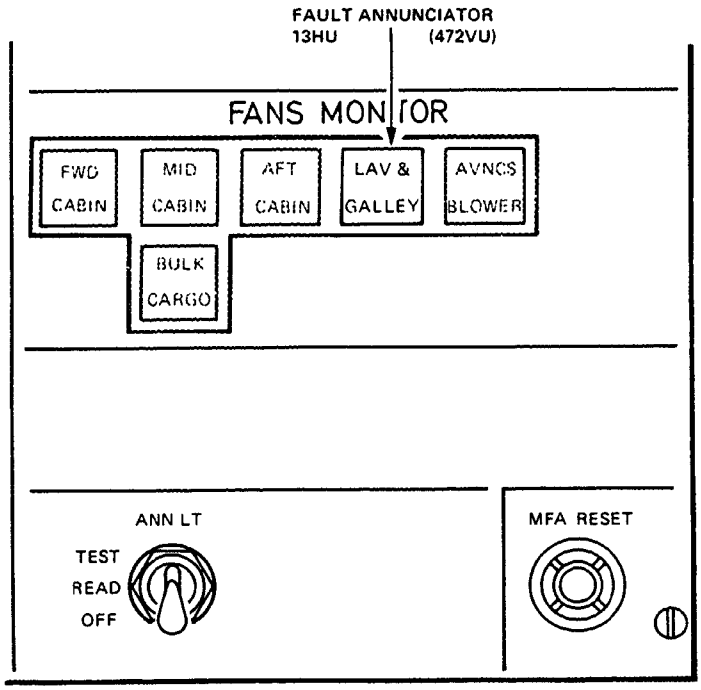

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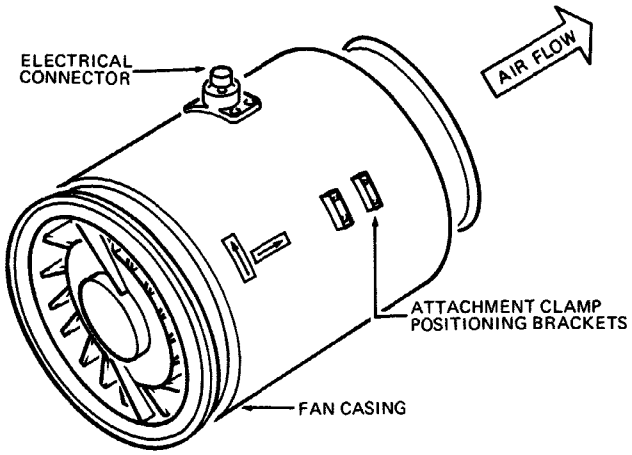
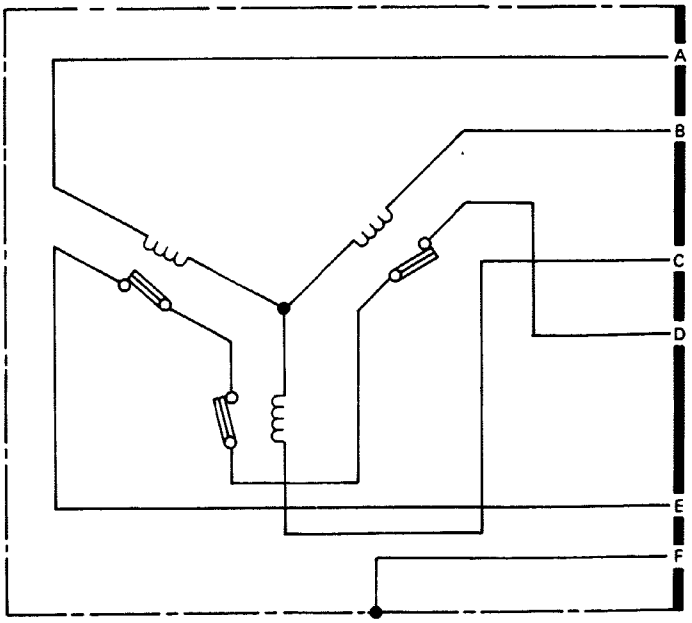
Controls and Indicators
Figure 003





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Extraction Fan 5HU
Figure 004

5. Extraction Operation

(Ref. Fig. 005)

A. Normal Operation

28 V DC from busbar 305PP is supplied via circuit breaker 10HU to activate the fan power relay 6HU via differential pressure switch 8HU, if the differential pressure is less than 1 psi, or via landing gear relay 153GB when the aircraft is on the ground. The fan power relay 6HU closes to energize the extraction fan with three-phase 115 V AC from busbar 106XP via circuit breaker 11HU. The ground for the power relay is via fail control relay 7HU and the fan internal thermo switches.

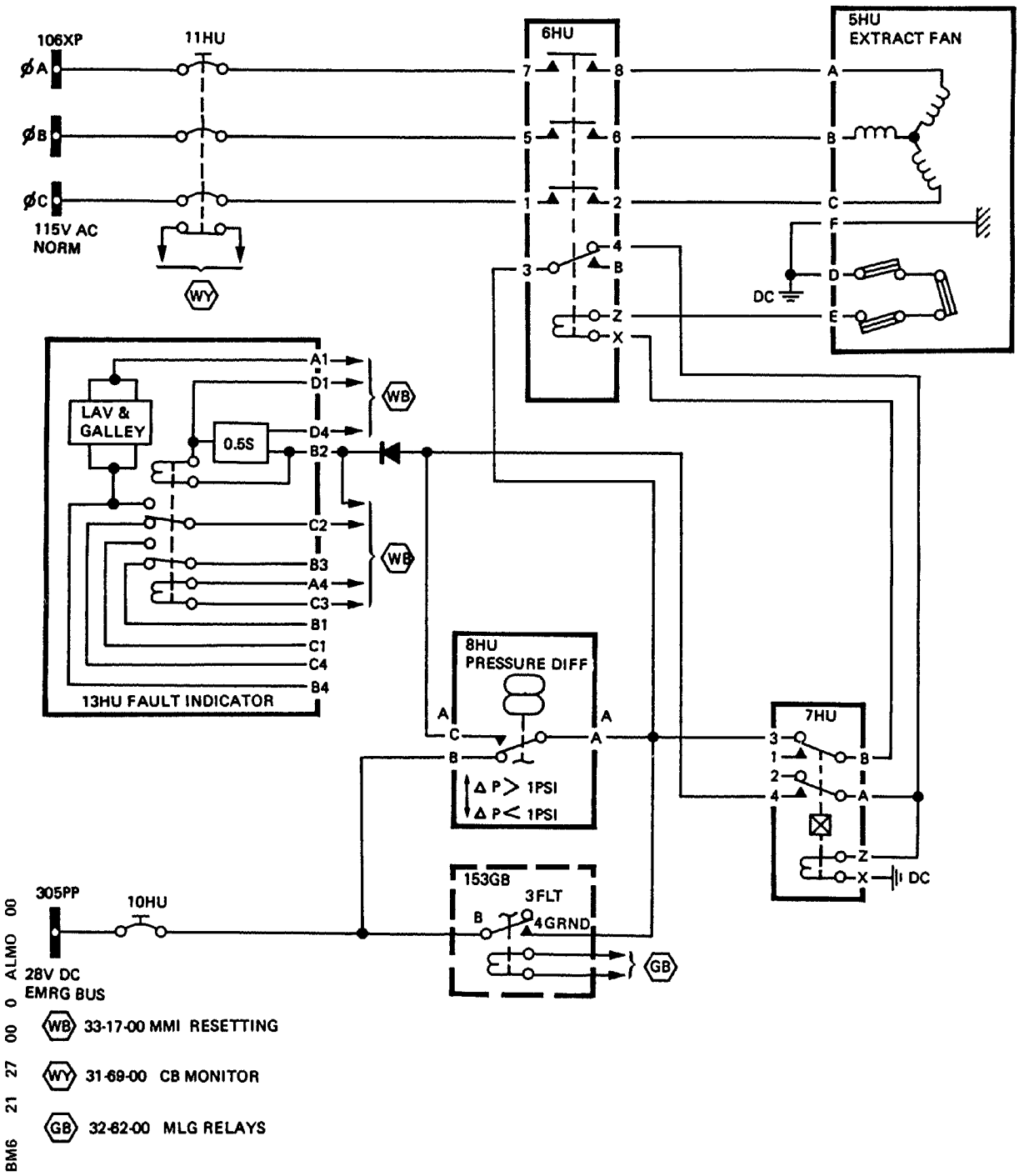
B. Malfunction Detection

Indication of a system malfunction is provided by the actuation of the LAV & GALLEY Memorized Fault Annunciator (MFA). Failure control relay 7HU is energized when:

- a fan thermo switch opens,
- the fan power relay 6HU fails,
- the aircraft is on the ground and the cabin diffential pressure is greater than 1 psi.

C. Test Capability

The only internal system test of the extraction circuit is the annunciator light test via circuit LP (Ref. 33-14-00).



Lav & Galley Extraction Schematic
Figure 005

R 1. Functional Test of Galley and Lavatory Air Extraction System (Pressure Drop Test)

A. Reason for the Job

(1)To check that extraction airflow is within limits.

R (2)To prevent extraction duct damage caused by clogging.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz
(2)	Pressure Measuring Device 0 to 20 mbar with 7/16 - 20 UNF-3A Female Connector to Pressure Ports
R (3)	Sheet of Paper - suitable

Referenced Procedures

R - 21-27-00, P. Block 1	Lavatory & Galley Ventilation
R - 21-63-00, P. Block 301	Flight Compt & Cabin Temp Control
- 24-41-00, P. Block 301	AC External Power Control
R - 25-23-13, P. Block 401	Utility Area Ceiling Panels
R - 25-30-00, P. Block 301	Buffet and Galley

2. Procedure

R (Ref. Fig. 501)

A. Job Set-Up

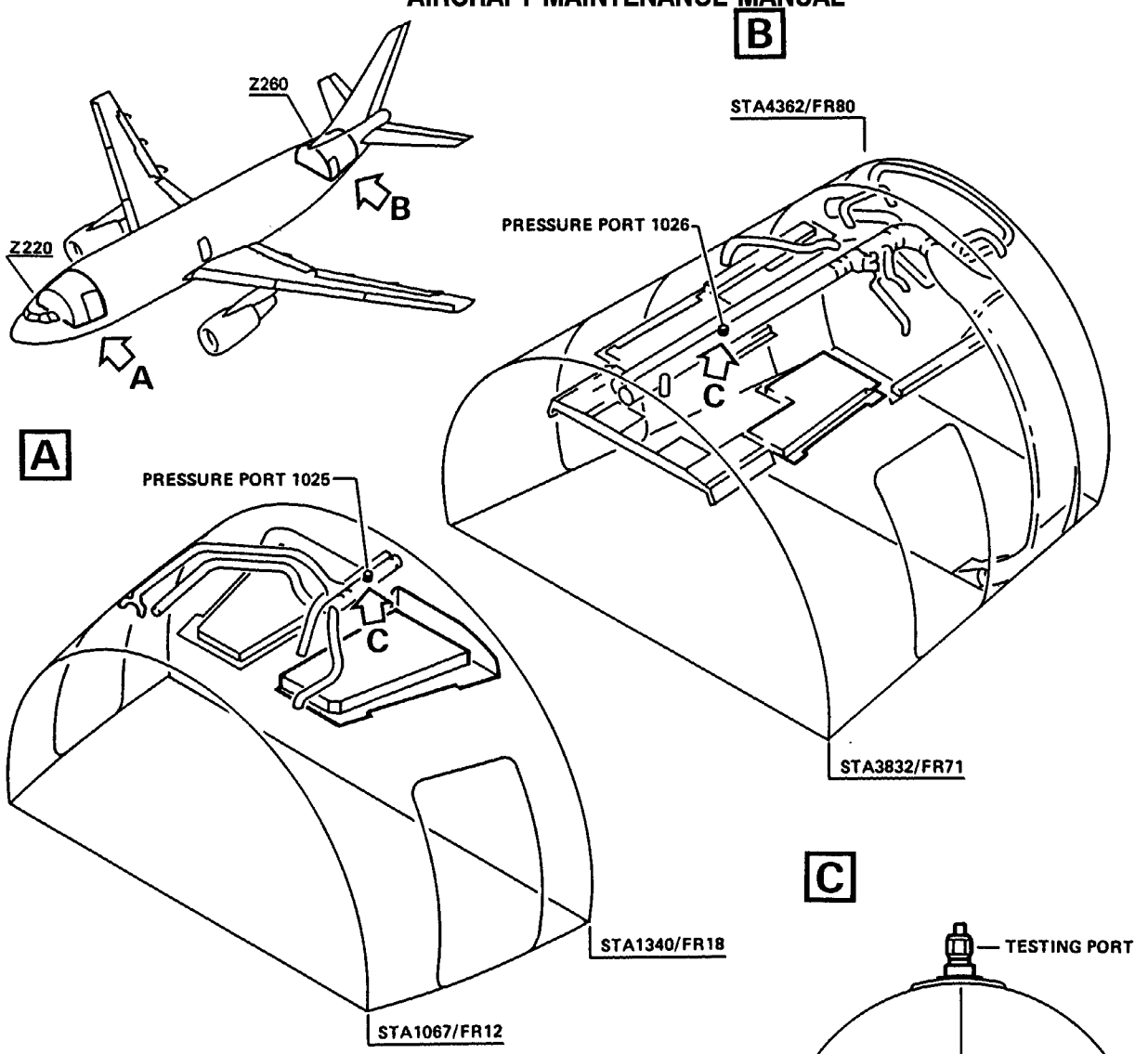
(1)Remove LH utility area ceiling panels at FR14.2 (pressure port 1025) and FR74 (pressure port 1026) (Ref. 25-23-13, P. Block 401).

(2)Connect electrical ground power unit and energize aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3)Make certain that electronics racks ventilation is correct.

(4)Make certain that the following circuit breakers are closed.

PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILATION-GALLEY&LAV FAN/SUPPLY	11HU	314/E60
131VU	VENTILATION-GALLEY&LAV FAN/CTL	10HU	314/E62



MAXIMUM EXPECTED DIFFERENTIAL PRESSURE (mbar)		
	NEW A/C	IN–SERVICE A/C
PORT NO. 1025	7	10
PORT NO. 1026	9	12

TABLE 1: MAXIMUM EXPECTED DIFFERENTIAL PRESSURE AT PRESSURE PORTS 1025 AND 1026.

NOTE: MINIMUM DIFFERENTIAL PRESSURE SHOULD NOT BE LESS THAN 5.6 mbar WITH A/C IN DELIVERY CONFIGURATION.

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R Pressure Ports and Pressure Port Location
Figure 501

B. Test
(1)Check airflow in the extraction system.
(a)Hold a suitable sheet of paper at all relevant air extraction duct openings:
- for lavatory extraction (Ref. 21-27-00, P. Block 1);
- for galley filtration system (Ref. 25-30-00, P. Block 301);
- for cabin temperature sensor intake grids (Ref. 21-63-00, P. Block 301).

NOTE : The sheet of paper will be drawn onto the air intake openings if the duct is not clogged.
Check only one air extraction duct opening at a time.

(b)Remove sheet of paper.
(2)Remove pressure port blanking cap from pressure port 1025.
(3)Connect upstream connection of pressure gage to pressure port.
NOTE : Differential pressure should not exceed 10 mbar. Minimum differential pressure should not be less than 5.6 mbar.
(4)Remove pressure gage connection from pressure port and install blanking cap to pressure port.
(5)Repeat steps (2) to (4) at pressure port 1026.
NOTE : Differential pressure should not exceed 12 mbar. Minimum differential pressure should not be less than 7 mbar.

C. Close-Up
(1)De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Install ceiling panels (Ref. 25-23-13, P. Block 401).

1. Lavatory extraction duct cleaning

A. Reasons for the Job
(1)To prevent odors in lavatories.
(2)To ensure airflow to smoke detector, if fitted.
(3)To prevent extraction duct damage caused by clogging.
(4)To prevent degradation of extraction system by obstructed venturi.

B. Equipment and Materials

ITEM	DESIGNATION
A.	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz
B	Access Platform
C.	Torque Wrench, up to 0.75 m.daN (66 lbf.in.)
D.	Seal
E.	Vacuum Cleaner
F.	Nonmetallic Scraper
G.	Lint-Free Cloth
H.	Soft Brush
J. Material 09-013	Sealants (Ref. 20-31-00)
or Material 09-016	Sealants (Ref. 20-31-00)
K. Material 11-002	Cleaning Agents (Ref. 20-31-00)

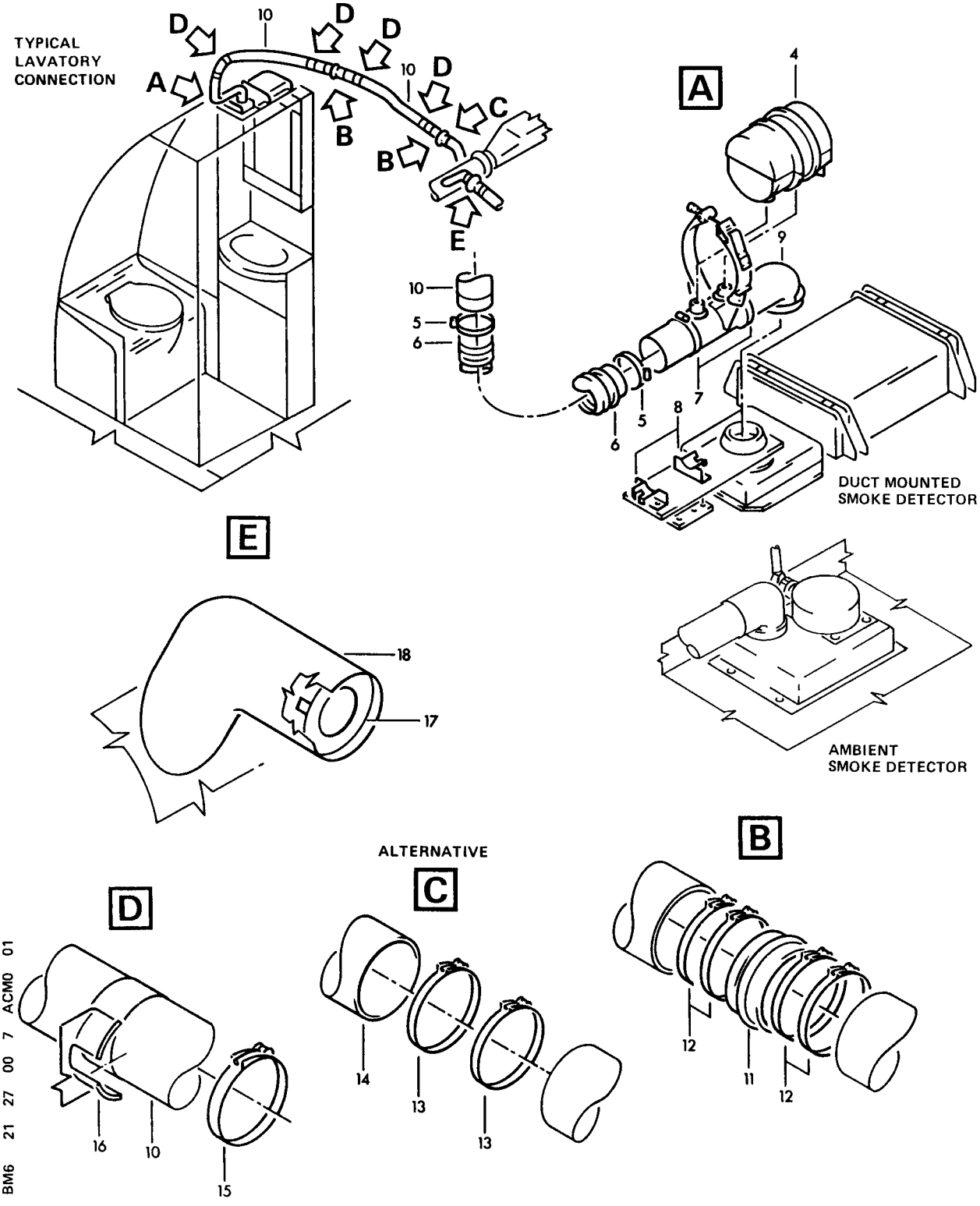
Referenced Procedures

- 24-41-00, P. Block 301	AC-External Power Control
- 25-23-11, P. Block 401	Ceiling Panels
- 25-23-13, P. Block 401	Utility Area Ceiling Panels
- 26-17-11, P. Block 401	Smoke Detector

C. Procedure (Ref. Fig. 701)
(Ref. Fig. 702)
(1)Job Set-Up
(a)Open lavatory ceiling access panel.
(b)Remove ceiling panels (Ref. 25-23-11, P. Block 401) and utility area ceiling panels (Ref. 25-23-13, P. Block 401) for access to extraction ducts, connecting lavatories to main extraction duct.
(c)Open, safety and tag the following circuit breakers:

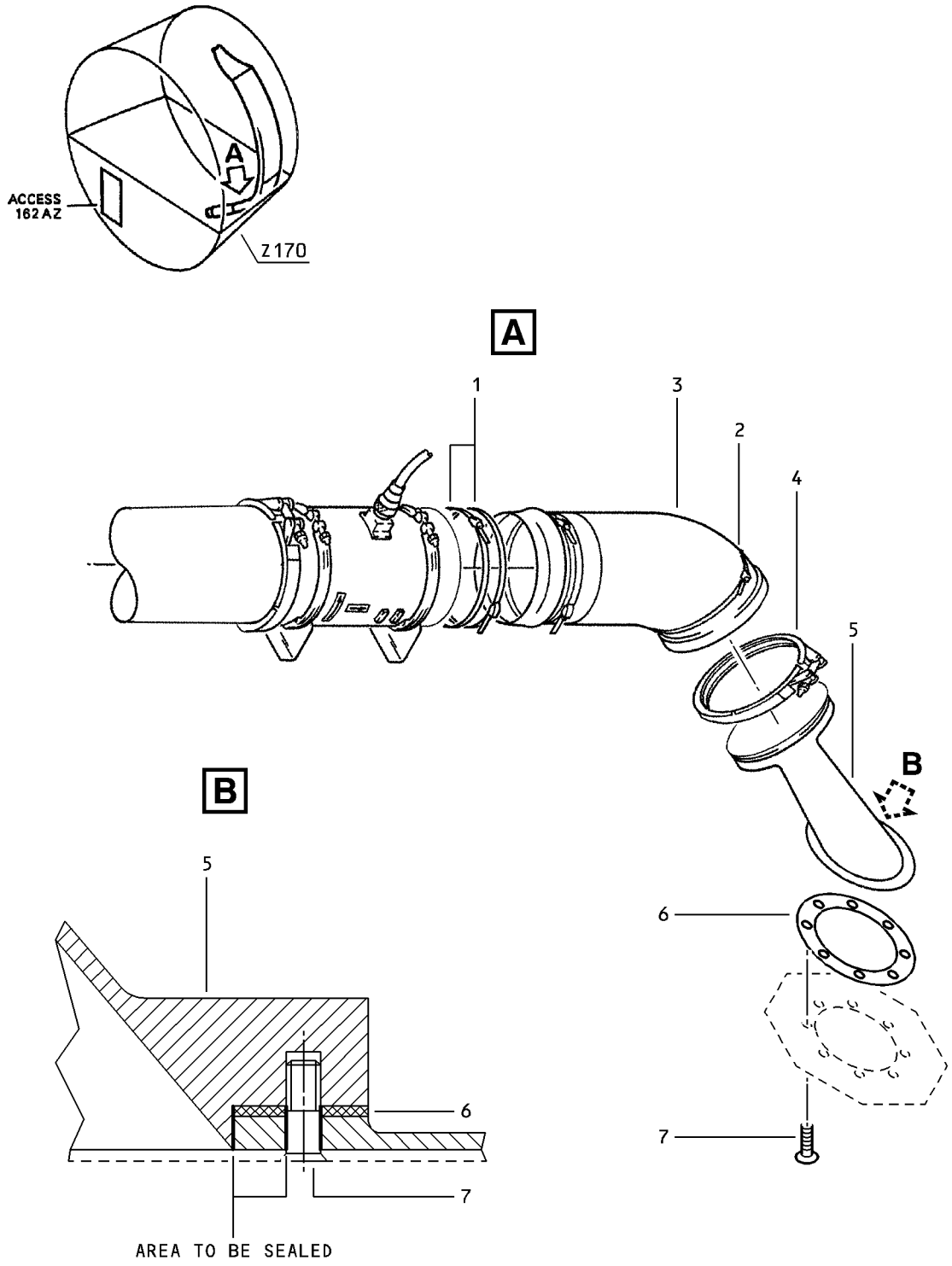
PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILATION/GALLEY & LAV FAN/SUPPLY	11HU	E60
131VU	VENTILATION/GALLEY & LAV FAN/CTL	10HU	E62

(d)To prevent contamination of duct mounted smoke detector, remove smoke detectors (4) (Ref. 26-17-11, P. Block 401), if fitted.



Lavatory Extraction Duct Cleaning
Figure 701

R



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R

Venturi
Figure 702

NOTE : It is not necessary to remove ambient smoke detectors beside extraction ducts to be cleand.

(e)Remove ducts between lavatory and main extraction duct.

1 Remove clamps (5) and hose (6).

2 Loosen clamps (7) and release from brackets (8).

3 Remove extraction duct (9).

4 Release clamps (12) and remove sleeves (11).

NOTE : An alternative connection method to main extraction duct may be with hose (14) and clamps (13).

5 Release clamps (15) from brackets (16) and remove extraction duct (10)

(f)Remove the tube (3) between lavatory/galley fan and venturi: (Ref. Fig. 702)

1 Position access platform.

2 Open BULK cargo compartment door 813 and access door 162AZ.

3 Remove clamps (1) and (2).

4 Remove clamp (4) and tube (3).

(g)For removal of venturi proceed as follows:

NOTE : It is recommended to clean the venturi in situ. The removal of the venturi should only be done if no sufficient cleaning result can be achieved in situ.

1 Free venturi (3) from isolation.

2 Remove screws (7).

3 Carefully remove venturi (3) by pulling from sealing.

4 Remove and discard seal (6).

(h)Connect electrical ground power unit and energize aircraft electrical network (Ref. 24-41-00, P. Block 301).

(j)Make certain that electronics racks ventilation is correct.

(2)Cleaning

(a)Clean removed ducts, hoses and sleeves using compressed air, lint-free cloth and soft brush as far as possible.

(b)Clean main extraction duct truncation with vacuum cleaner, lint-free cloth and soft brush as far as possible.

NOTE : In the end-sleeve (18) and on both sides of restrictor (17), if fitted, dried up particles must be removed by nonmetallic scraper and vacuum cleaner.

(c)In lavatories clean extraction ducts as follows:

1 Clean extraction duct with vacuum cleaner, lint-free cloth and soft brush as far as possible.

NOTE : Make certain that smoke detector inlet and outlet connections are free of obstructions.

2 Blow compressed air into air extraction ceiling opening.

NOTE : While blowing compressed air into ceiling opening, hold suction hose of vacuum cleaner close to upper side of air extraction ceiling opening.

3 Clean extraction duct grill in lavatory ceiling opening with vacuum cleaner, lint-free cloth and soft brush.

(d)Clean venturi as follows:

1 Remove sealing from venturi (if removed) and structure mating

surface using nonmetallic scraper.
2 Remove dried up particles from inside venturi (3) using nonmetallic scraper.
WARNING : USE EXTREME CARE WHEN WORKING WITH CLEANING AGENT No. 11-002. THE SOLVENT VAPORS ARE TOXIC AND FLAMMABLE. MAKE CERTAIN THAT WORKING AREA IS WELL VENTILATED. DO NOT INHALE FUMES, MIST OR DUST. PROTECT EYES AND SKIN. APPLY ONLY IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS. FIRE PROTECTION REGULATIONS MUST BE OBSERVED.
3 Remove residual particles from inside venturi using cleaning agent Mat. 11-002.
4 Clean mating surface of structure and venturi (if removed) using cleaning agent Mat. 11-002.

(3)Close-Up
(a)Re-install ducts between main extraction duct and lavatories.
1 Position extraction duct (10) to brackets (16), and install clamps (15).
2 Position sleeves (11) and install clamps (12).
NOTE : Ends of sleeve must be within color markings.
NOTE : An alternative connection method to main extraction duct may be with hose (14) and clamps (13).
3 Install extraction duct (9).
4 Position clamps (7) onto brackets (8), and tighten.
5 Connect hose (6) to extraction duct (9),(10), and install clamp (5).
(b)Re-install venturi: (Ref. Fig. 702)
1 Position seal (6) to structure mating surface.
2 Apply sealent Mat. 09-013 or Mat. 09-016 to venturi (5) and shaft of screws (6) (Ref. Fig. 702).
3 Position venturi (3).
4 Install screws (7)
5 Remove residual sealing.
(c)Install tube between lavatory and galley fan and venturi:
1 Position tube (3).
2 Install clamps (1) and (2).
3 Install clamp (4).
4 TORQUE clamp (4) to between 0.51 and 0.56 m.daN (45 and 50 lbf.in.).
5 Install isolation.
6 Close access door 162AZ and BULK cargo compartment door 813.
7 Remove access platform.
(c)Install smoke detector (4) (Ref. 26-17-11, P. Block 401), if fitted.
(d)Install ceiling panels (Ref. 25-23-11, P. Block 401) and utility area ceiling panels (Ref. 25-23-13, P. Block 401).
CAUTION : MAKE SURE THAT THE AIR EXTRACTION GRILL, THE SMOKE DETECTOR AND THE AIR EXTRACTION DUCT ARE IN LINE WITH THE EXTRACTION AIRFLOW. INCORRECT INSTALLATION CAN CAUSE MALFUNCTION OF THE SMOKE DETECTOR, IF FITTED.
(e)Check installation of air extraction grill.
(f)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(g)Close lavatory ceiling access panel.

(h)Remove safety clips and tags and close circuit breakers 11HU and 10HU.
(j)De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.3 m (7.5 ft.)
B.	Torque Wrench, up to 0.75 m.daN (66 lbf.in.)
C.	Blanking Cap/Plug
D.	Protective Covers

Referenced Procedure

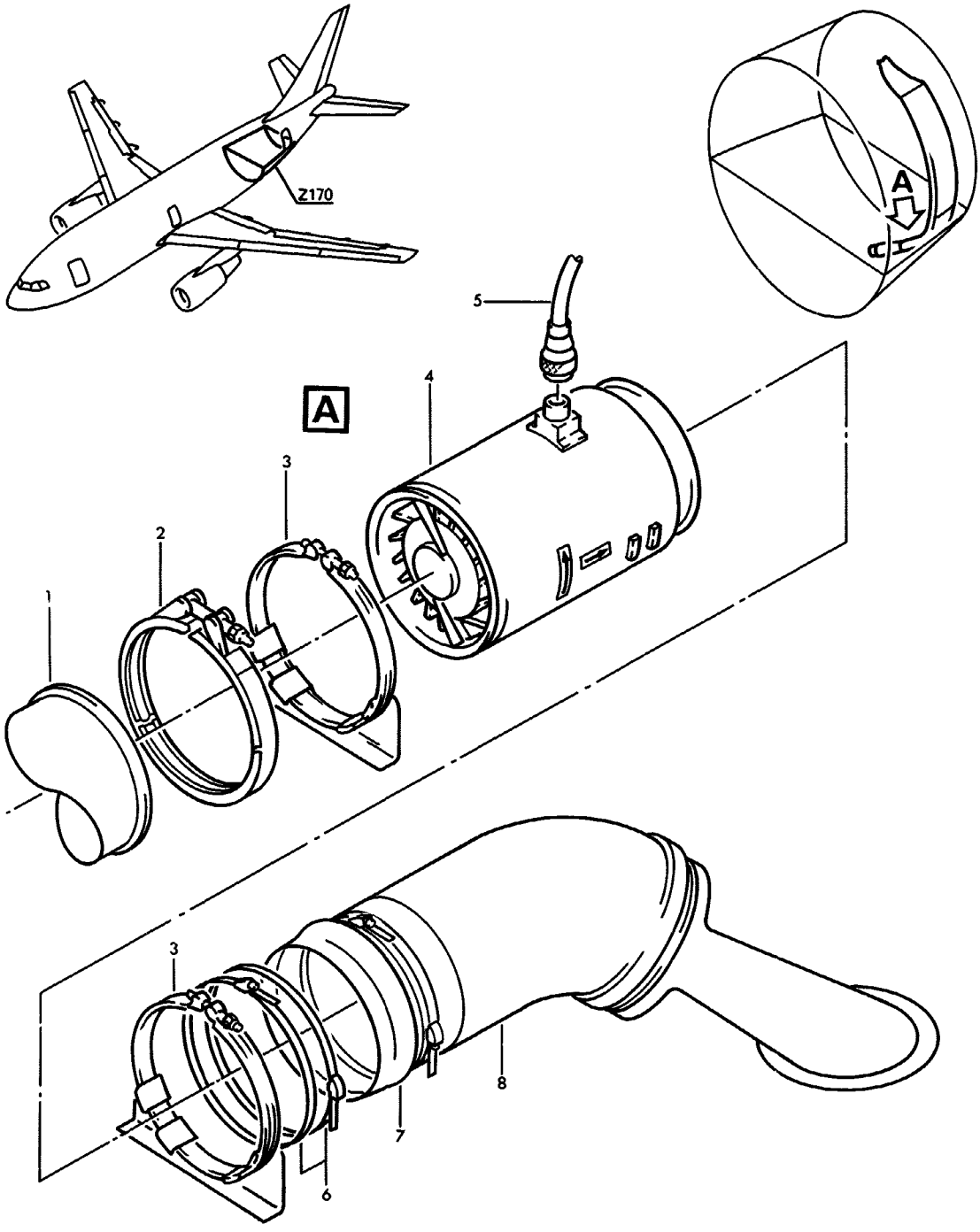
- 24-41-00, P. Block 301	AC External Power Control

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILATION-GALLEY & LAV FAN/SUPPLY	11HU	314/E60
131VU	VENTILATION-GALLEY & LAV FAN/CTL	10HU	314/E62

(2)Position access platform.
(3)Open BULK cargo compartment door 813 and access door 162AZ.



Lavatory and Galley Fan
Figure 401

B. Removal
(1)Disconnect electrical connector (5) 5HU-A and fit blanking cap/plug.
(2)Remove clamp (2).
(3)Remove clamps (6) and flexible sleeve (7).
(4)Remove clamps (3) and fan (4). Install protective covers.

C. Preparation for Installation
(1)Visually inspect clamps, flexible sleeve and fan for cracks and corrosion. Replace if necessary.

D. Installation
(1)Remove protective covers and position fan (4). Install clamps (3). TORQUE to between 0.28 and 0.38 m.daN (24.8 and 33.5 lbf.in.).
NOTE : Observe direction of air flow.
(2)Position flexible sleeve (7) and install clamps (6).
(3)Position extraction duct (1) and install clamp (2). TORQUE clamp to between 0.51 and 0.56 m.daN (45 and 50 lbf.in.).
(4)Remove blanking cap and plug, connect electrical connector (5) 5HU-A.

E. Test
(1)Connect electrical ground power unit and energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that electronics racks ventilation is correct.
(3)Remove safety clips and tags and close circuit breakers 10HU and 11HU.
(4)Check that ventilation fan operates.
NOTE : The ventilation fan operates automatically with aircraft on ground.

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 162AZ and BULK cargo compartment door 813.
(3)De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(4)Remove access platform.

1. Removal/Installation

A. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Caps/Plugs
B.	O-Ring
C.	Circuit Breaker Safety Clips and Tags
D.	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz
E. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 34-10-00, P. Block 501	Flight Environment Data

B. Procedure

(Ref. Fig. 201)

(1)Job Set-Up

(a)Open, safety and tag the following circuit breaker:

PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILATION-GALLEY & LAV FAN CTL	10HU	E62

(b)Open access door 121BL or 131AZ.

(2)Removal

(a)Disconnect electrical connector (1) 8HU-A. Fit blanking cap/plug.

(b)Disconnect and remove line (4). Fit blanking caps/plugs.

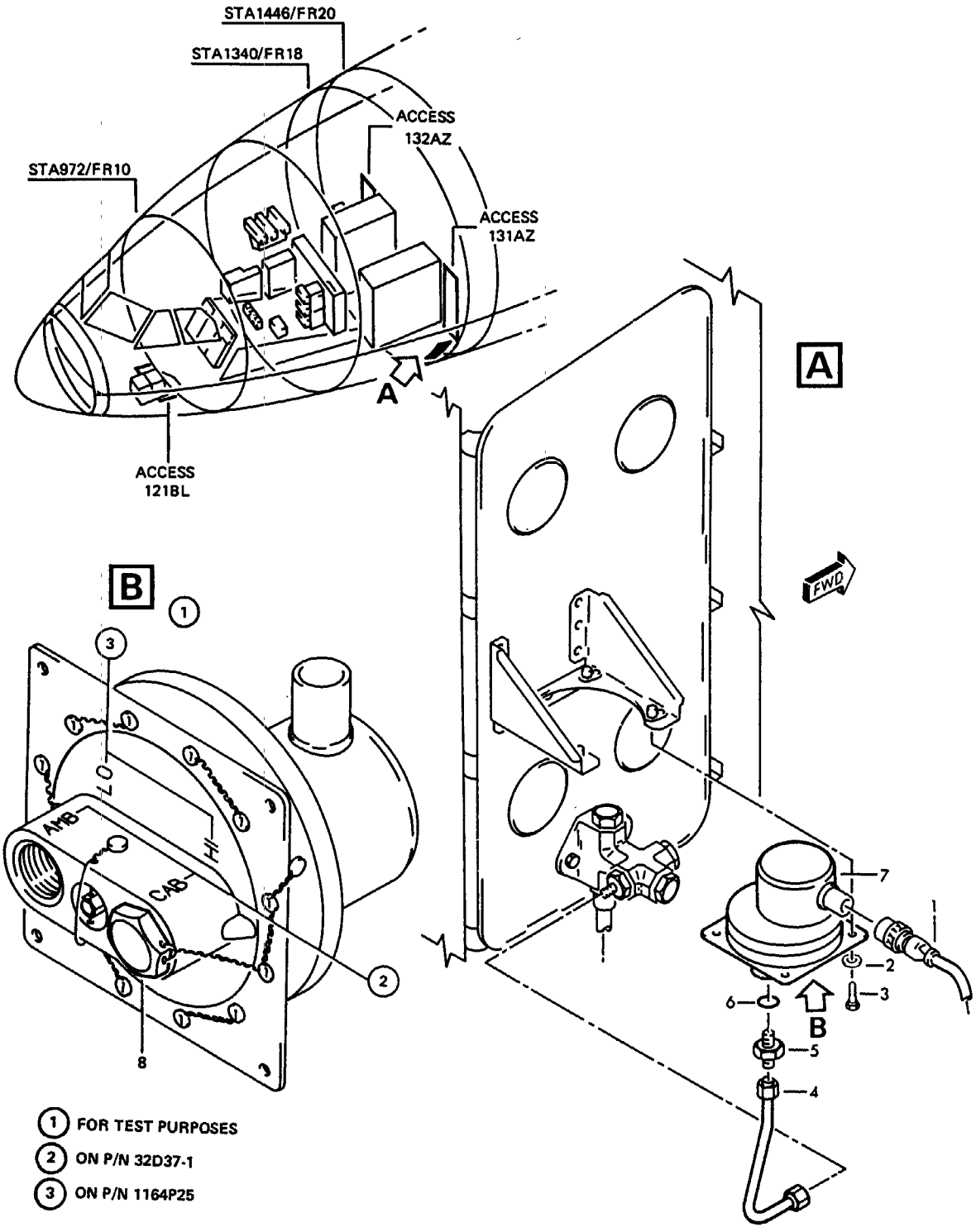
(c)Remove bolts (3), washers (2) and differential pressure switch (7).

(3)Preparation of Replacement Component

(a)Remove fitting (5) and discard O-ring.

(b)Clean fitting (5) using solvent (Mat. No. 11-002) and check for correct condition.

(c)Fit new O-ring (6) to fitting (5) and install in replacement differential pressure switch (7) at AMB pressure port.



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Differential Pressure Switch - 8HU
Figure 201

R

(4)Installation
(a)Install differential pressure switch (7) with bolts (3) and washers (2).
(b)Remove blanking caps/plugs and install line (4).
(c)Remove blanking cap/plug and connect electrical connector (1) 8HU-A.
(5)Test
(a)Carry out leak test of standby pitot static system (Ref. 34-10-00, P. Block 501) and check differential pressure switch connections for leaks.
(b)Connect electrical ground power unit and energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Make certain that electronics racks ventilation is correct.
(d)Remove safety clip and tag, and close circuit breaker 10HU.
(e)Make certain that the following circuit breaker is closed.

PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILATION/GALLEY & AV FAN SUPPLY	11HU	E60

(f)Check that ventilation fan 5HU is operating.
(6)Close-Up
(a)De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(b)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(c)Close access door 121BL and 131AZ.

2. Functional Test

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Source of clean, dry, compressed air, minimum 2.0 psig (0.138 bar).
(2)	Continuity Tester
(3)	Corrosion-Resistant Steel Lockwire, 0.8 mm (0.032 in.) dia.
(4)	Blanking Caps/Plugs

B. Procedure (Ref. Fig. 201)

(1)Job Set-Up

(a)Open access door 121BL or 131AZ.

R (b)On pressur switch P/N 32D37-1
R cut and remove lockwire and remove vent plug (8).

(c)Disconnect and remove line (4). Fit blanking caps/plugs.
NOTE : Do not cap pressure switch fitting (5).

(d)Disconnect electrical connector (1) 8HU-A.

(e)Connect air source to CAB pressure port.

(2)Perform test.

ACTION	RESULT
1. Check for continuity between terminals A-B.	- Circuit A-B must be closed.
2. Slowly apply 2.0 psig (0.138 bar) to R CAB pressure port or HI pressur R port respectively	- Pressure switch actuates, indicated by audible 'snap'.
3. Check for continuity between terminals A-C.	- Circuit A-C must be closed.
4. Slowly decrease pressure to ambient and check for continuity between terminals A-B.	- Pressure switch 'snaps'. - Circuit A-B must be closed.

(3)Close-Up

(a)Disconnect air source.

R (b)On pressure switch P/N 32D37-1
R install vent plug (8) and safety with lockwire.

(c)Remove blanking caps/plugs and install line (4).

(d)Connect electrical connector (1) 8HU-A.

(e)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(f)Close access door 121BL and 131AZ.

CARGO COMPARTMENT VENTILATION - DESCRIPTION AND OPERATION

1. General

The cargo compartment ventilation system provides a means of conveying ventilation air to and from the BULK cargo compartment.
Separate temperature regulation of the compartment is controlled by a related system (Ref. 21-64-00).

A. Air Supply Sources

The BULK cargo compartment is supplied with air from the following sources to provide the required environmental conditions:

(1) Cabin Zones

Ambient air exhausted from the cabin zones through openings in the floor behind the sidewall panels is the main air source utilized for cargo ventilation.

(2) Hot Air Manifold

Bleed air supplied from the hot air manifold is mixed with the cabin ambient air to raise the compartment temperature as required by the temperature control system.

(3) Not applicable

(4) Electronics Racks Air Extraction

The FWD cargo compartment underfloor area is supplied with air extracted from the avionics compartment and is controlled by the electronics racks air extraction valve position (Ref. 21-23-00).

2. System Description

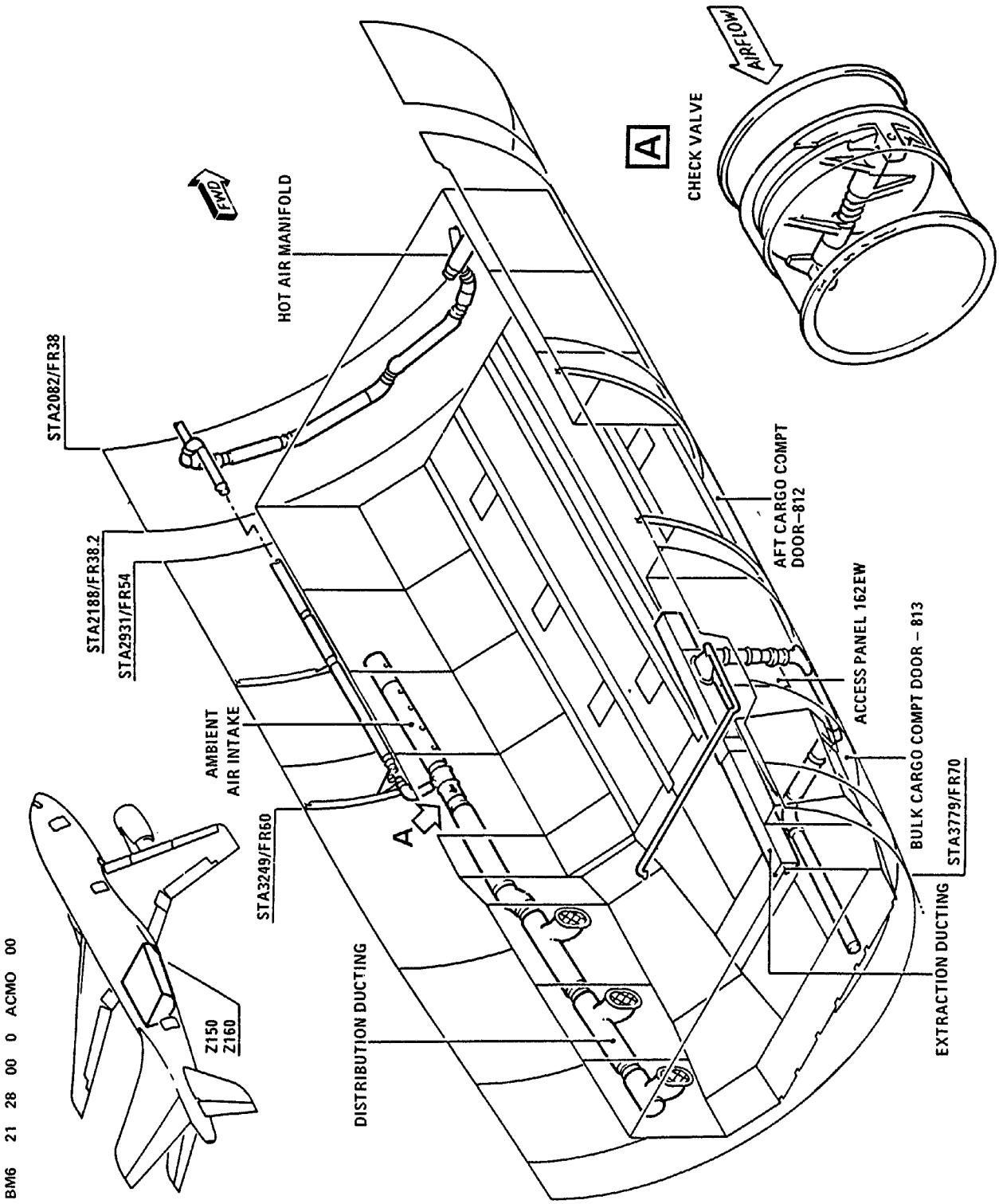
(Ref. Fig. 001)

A. Distribution

Air is supplied to the cargo compartment through distribution ducting routed along the lower LH fuselage interior. Hot air is collected from the manifold situated beneath the rear portion of the FWD cargo compartment floor. Hot air ducting is then routed towards the BULK cargo compartment distribution ducting.
The compartment distribution ducting then serves as a mixing chamber, combining the ambient cabin air with the hot air. This mixed air is then directed towards the floor area from outlets along the compartment LH sidewall. A check valve is installed downstream of the mixing section to prevent reverse airflow.

B. Extraction

Ducting along the lower RH fuselage interior is used for extracting ambient air from the cargo compartment and then routing the air to the compartment underfloor area. Openings, located along the upper area of the compartment RH sidewall, allow for collecting the ambient air. In addition, a ceiling mounted opening is provided to extract air from a central location within the compartment to obtain a mean air temperature sample.



BULK Cargo Compartment Ducting
Figure 001

3. Component Description

A. Check Valve
A check valve is installed downstream of the BULK cargo compartment distribution ducting mixing section. The check valve is designed to allow for a one-way only direction of air flow. The valve is of the two semi-circular butterfly flap type with the flaps held in the closed position by spring force. Airflow in the proper direction will override the spring tension allowing the flaps to open.

4. Interfaces (Ref. 21-64-00)

A. Air circulation
The cargo compartment's ventilation air flow is ensured by an electrical fan controlled by the isolation valve position. In the event of smoke detection system activation in any cargo compartment, the BULK compartment isolation valve will close together with the hot trim air valve and the fan switches off.

B. Temperature Control
Automatic compartment temperature control is achieved through use of the temperature controller (associated with sensors located in the distribution/extraction ducting), which controls the trim air valve position and the compartment selector.

1. For components such as valves, fans or sensors related to temperature control refer to 21-64-00 and subsequent.

BULK CARGO COMPARTMENT VENTILATION DUCTING REMOVAL/INSTALLATION

R **WARNING** : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL
R CIRCUITS, UPON WHICH WORK IS IN PROGRESS, ARE ISOLATED.

R **WARNING** : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM,
R MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
R DISPLAY A WARNING NOTICE PROHIBITING ENGINE START UP.
R DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH
R PLACED IN OFF/R POSITION.

R 1. Reasons for the Job

R A. Removal/Installation of the RH Bulk Cargo Compartment Ventilation Ducting.

R B. Removal/Installation of the LH Bulk Cargo Compartment Ventilation Ducting.

R 2. Removal of the RH Bulk Cargo Compartment Ventilation Ducts

R A. Equipment and Materials

ITEM	DESIGNATION
R (1)	Access Platform, 2.3 m (7.5 ft.)

R B. Procedure (Ref. Fig. 401)

R C. Job Set-Up
(1)Position the access platform and open the BULK cargo compartment door 813.

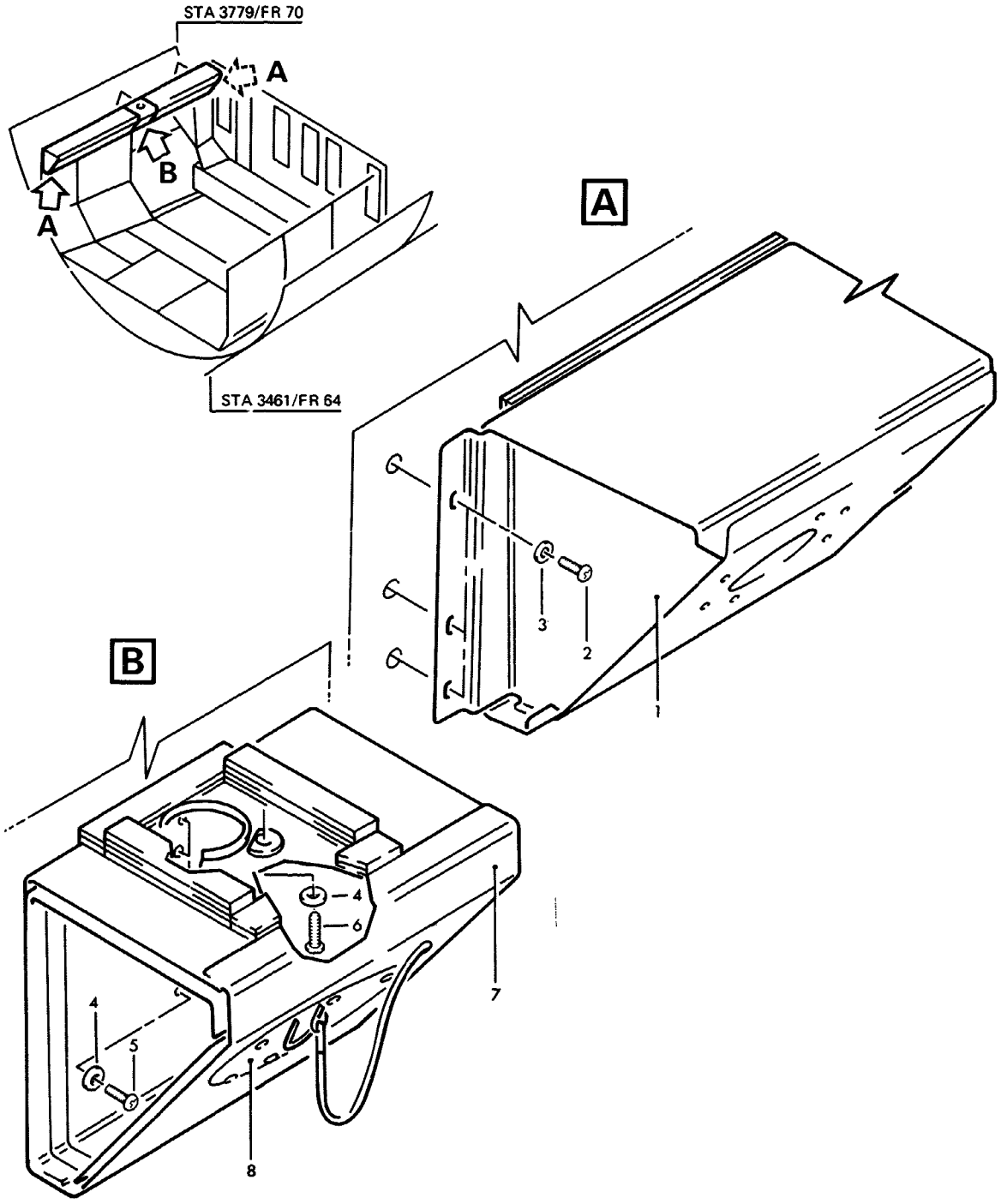
R D. Removal
(1)Remove the screws (2), washers (3) and ducting (1).
(2)Release the fasteners and remove the cover (8).
(3)Remove the screws (5, 6), washers (4) and support box (7).

R E. Installation
(1)Position the support box (7), install screws (5, 6) and washers (4).
(2)Install the ducting (1), screws (2) and washers (3).
(3)Install the cover (8).

R F. Close-Up
(1)Make sure that the working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close the BULK cargo compartment door 813.
(3)Remove the access platform.

R 3. Removal of the LH Bulk Cargo Compartment Ventilation Ducts

R A. Equipment and Materials



Extraction Ducting
Figure 401

ITEM	DESIGNATION
(1)	Access Platform, 3 m (10 ft.)

Referenced Procedures

- 21-64-11, P. Block 401 — Duct Temperature Monitors
- 25-56-11, P. Block 201 — Bulk Cargo Compartment - Linings

B. Procedure (Ref. Fig. 402)

C. Job Set-Up

(1) Position the access platform and open the BULK cargo compartment door 813.
(2) Remove the BULK cargo compartment linings between FR63 and FR69 (Ref. 25-56-11, P. Block 201).
(3) Remove the duct temperature switch and sensors between FR65 and FR66 (Ref. 21-64-11, P. Block 401).

D. Removal

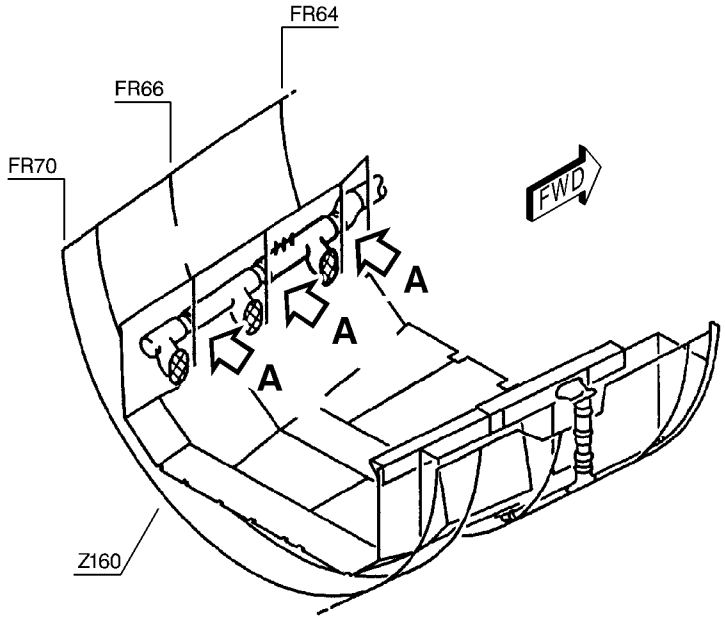
(1) Remove the clamps (3).
(2) Release the sleeve(s) (4) from the ducts (1).
(3) Remove the clamp(s) (2) from the duct(s) (1) and structure attachment(s).
(4) Remove the duct(s) (1).

E. Installation

(1) Put the sleeve(s) (4) in position on the duct(s) (1).
(2) Attach the duct(s) (1) to the structure attachments with the clamp(s) (2).
(3) Make sure that the clearance A between the ducts (1) is 7 ± 2 mm (0.28 ± 0.08 in.).
(4) Move the sleeve(s) (4) until it is between the red marks.
(5) Install and tighten the clamps (3).
(6) Install the duct temperature switch and sensors between FR65 and FR66 (Ref. 21-64-11, P. Block 401).

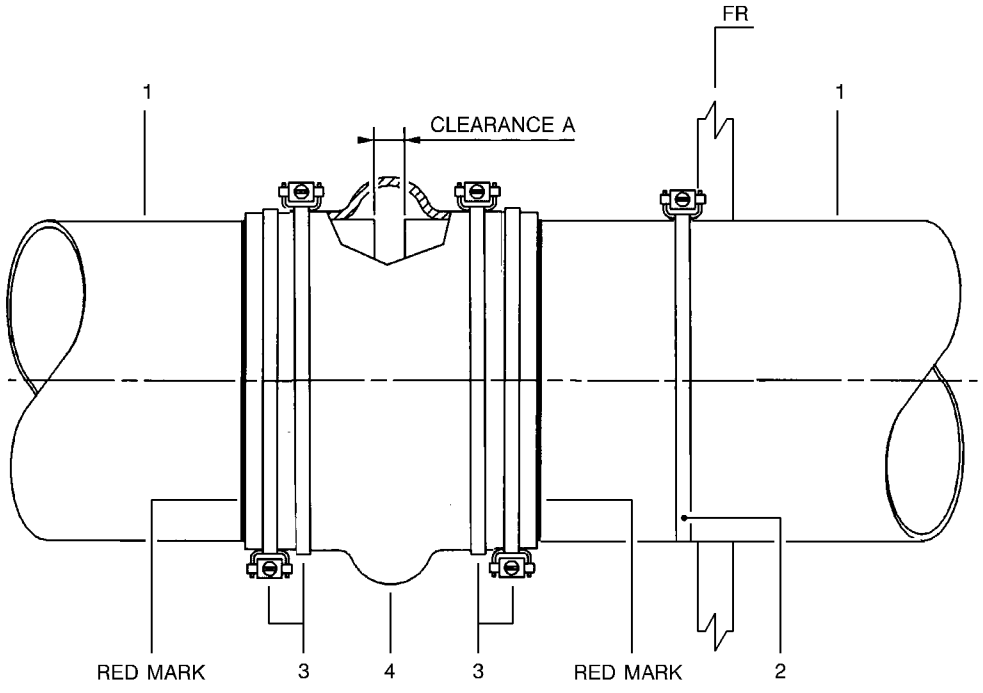
F. Close-Up

(1) Install the BULK cargo compartment linings (Ref. 25-65-11, P. Block 201).
(2) Make sure that the working area is clean and clear of tools and miscellaneous items of equipment.
(3) Close the BULK cargo compartment door 813.
(4) Remove the access platform.



A

EXAMPLE



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R

Distribution Ducting
Figure 402

PRESSURIZATION CONTROL - DESCRIPTION AND OPERATION

1. General

The purpose of the cabin pressurization control system is :

- to control the cabin pressure automatically in order to maintain cabin pressure and adjust cabin pressure/altitude rate of change within values compatible with optimum passenger confort.
- to enable the crew to control the cabin pressure.
- to protect against overpressure.
- to provide the crew with a mechanical control for manual cabin depressurization.

Cabin pressurization is achieved by controlling the amount of conditioned air discharged from the pressurized compartments.

2. Cabin Pressure Control and Monitoring (Ref. 21-31-00)

The automatic cabin pressure control is achieved by two identical systems ; only one system operates at a time, the other is in standby.
Evacuation of air from the pressurized compartments is provided by automatically and electrically controlled outflow valves.
In case of failure of the two automatic systems pressure regulation can be manually controlled from the flight compartment. The positive differential pressure and negative differential pressure safeties are automatically provided by two safety valves.

3. Cabin Pressure Monitoring

A cabin differential pressure indicator, an altimeter and a vertical speed indicator enable the crew to check that automatic cabin pressure control is operating correctly and to monitor cabin pressure/altitude rate of change when cabin pressure is controlled in manual mode or when cabin is depressurized manually in an emergency.
Indications are displayed on the right and left ECAM display units to alert the crew in the event of an anomaly so that they can take the appropriate corrective action (Ref. 31-51-00).

CABIN PRESSURE CONTROL AND MONITORING - DESCRIPTION AND OPERATION

R

1. General

Pressurization and its rate of change to satisfactory values for passenger and crew comfort and safety, are provided by controlling the amount of conditioned air discharged overboard through two identical, independent, automatic pressure control systems.

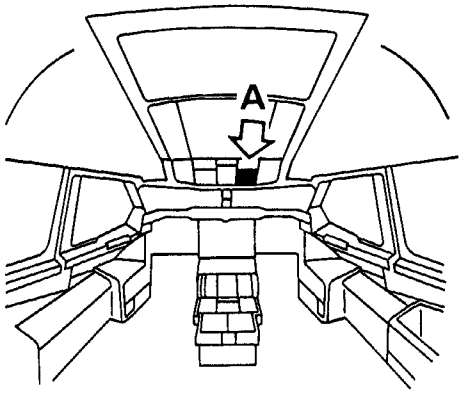
2. Component Location

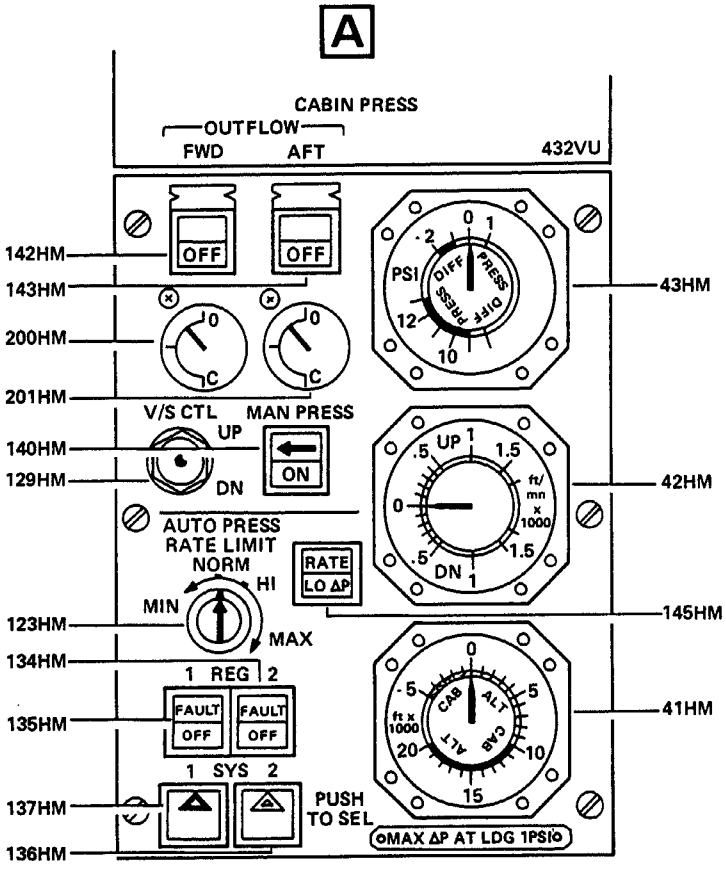
(Ref. Fig. 001)
(Ref. Fig. 002)
(Ref. Fig. 003)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
41HM	ALTIMETER - CABIN	432VU	212		21-31-00
42HM	IND - CABIN VERTICAL SPEED	432VU	212		21-31-00
43HM	IND - CABIN DIFF PRESS	432VU	212		21-31-00
104HM	SELECTOR - LANDING ELEVATION	4VU	212		21-31-00
105HM	CONTROLLER - CAB PRESS, SYS 1	96VU	122	121BL	21-31-11
106HM	CONTROLLER - CAB PRESS, SYS 2	92VU	122	121BL	21-31-11
122HM	P/BSW - CABIN PRESS/SYS TEST	471VU	212		21-31-00
123HM	SELECTOR - RATE LIMIT	432VU	212		21-31-00
129HM	SWITCH - CABIN PRESS/V/S CTL	432VU	212		21-31-00
134HM	P/BSW - CABIN PRESS/REG 2	432VU	212		21-31-00
135HM	P/BSW - CABIN PRESS/REG 1	432VU	212		21-31-00
136HM	P/BSW - CABIN PRESS/PUSH TO SEL/SYS 2	432VU	212		21-31-00
137HM	P/BSW - CABIN PRESS/PUSH TO SEL/SYS 1	432VU	212		21-31-00
140HM	P/BSW - MAN PRESS	432VU	212		21-31-00
142HM	P/BSW - CABIN PRESS/OUTFLOW/FWD	432VU	212		21-31-00
143HM	P/BSW - CABIN PRESS/OUTFLOW/AFT	432VU	212		21-31-00
144HM	ANNUNCIATOR - CABIN PRESS/SYS 1/2/ TEST/OK	471VU	212		21-31-00
145HM	ANNUNCIATOR - CABIN PRESS/RATE/LO ΔP	432VU	212		21-31-00
200HM	IND - CABIN PRESS FWD OUTFLOW VALVE POSITION	432VU	212		21-31-00
201HM	IND - CABIN PRESS AFT OUTFLOW VALVE POSITION	432VU	212		21-31-00
202HM	VALVE - CABIN PRESS OUTLFOW, FWD		137	131SW	21-31-12
203HM	VALVE - CABIN PRESS OUTFLOW, AFT		171	162AZ	21-31-12
204HM	VALVE - CABIN PRESS SAFETY, 2		136	136AR	21-31-15
205HM	VALVE - CABIN PRESS SAFETY, 1		136	136AR	21-31-15
206HM	MFA - CABIN PRESS/SAFETY VALVE/2/ OVERPRESS	471VU	212		21-31-00
207HM	MFA - CABIN PRESS/SAFETY VALVE/1/ OVERPRESS	471VU	212		21-31-00

**ON A/C ALL

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
Post SB 21-2062 For A/C ALL					
220HM	RELAY - CABIN PRESS OUTFLOW, AFT	103VU		121BL	21-31-00
221HM	RELAY - CABIN PRESS OUTFLOW, FWD	103VU		121BL	21-31-00
222HM	RELAY - CABIN PRESS OUTFLOW, AFT	103VU		121BL	21-31-00
223HM	RELAY - CABIN PRESS OUTFLOW, FWD	103VU		121BL	21-31-00





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Cabin Pressure Control - Controls and Indicating
Figure 001

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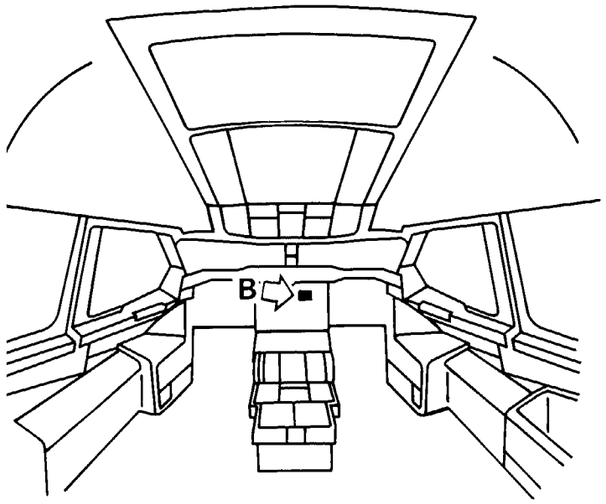
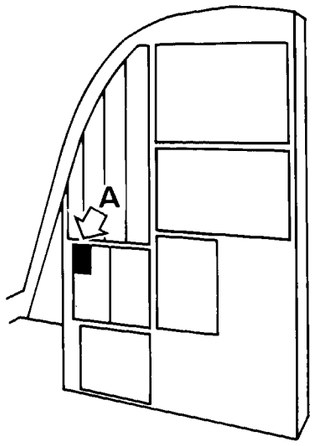
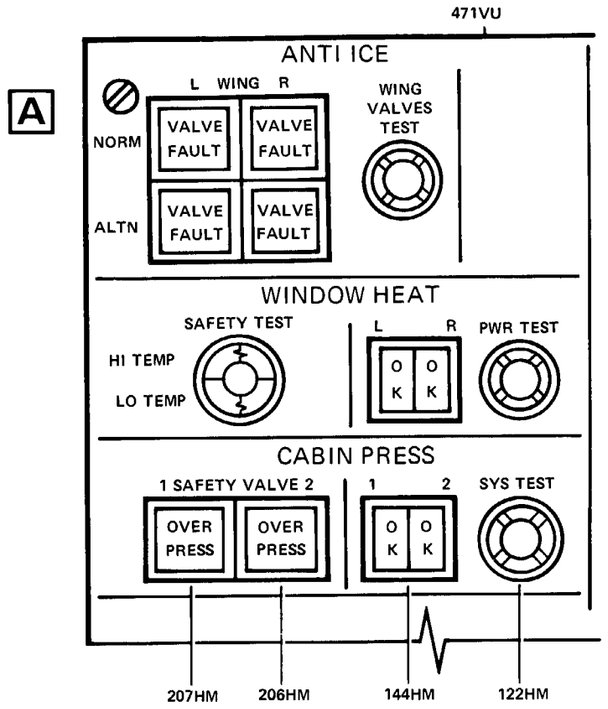
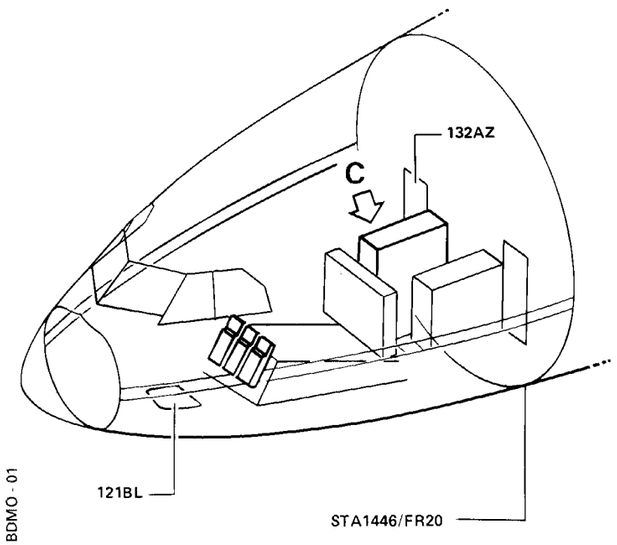
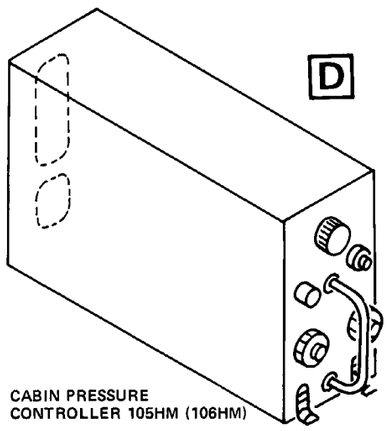
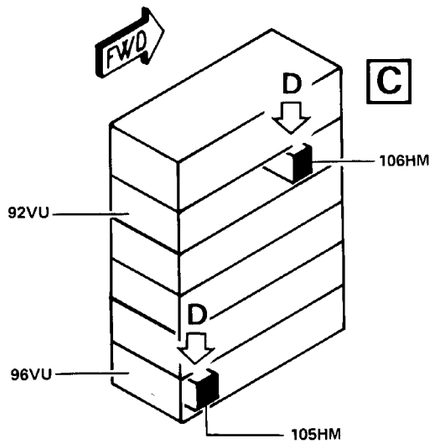


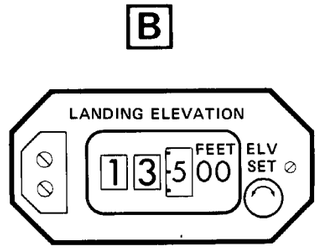








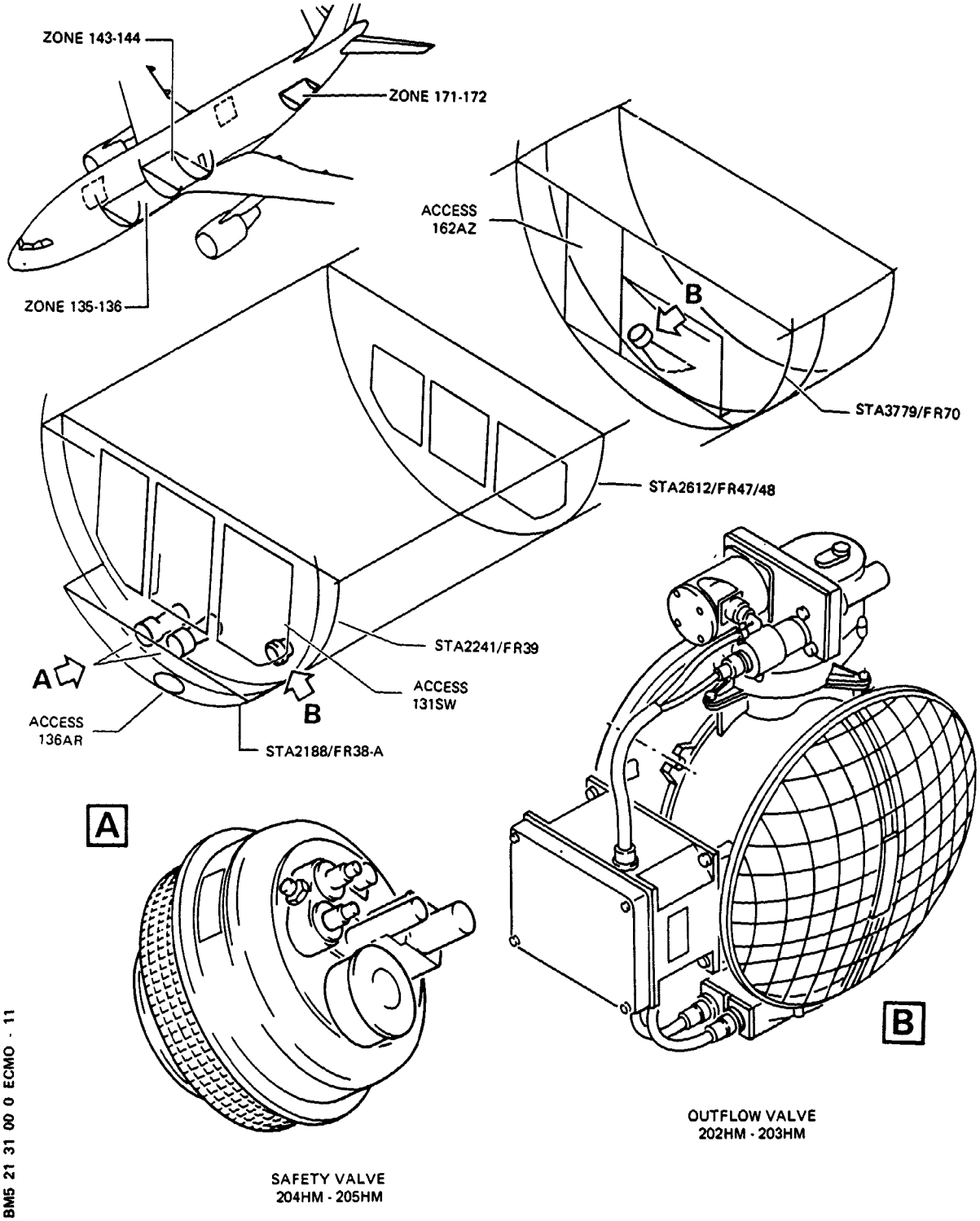




LANDING ELEVATION
SELECTOR 104HM

BM5 21 31 00 0 BDMO - 01

Cabin Pressure Control - Controls/Indicating and
Controller - location
Figure 002



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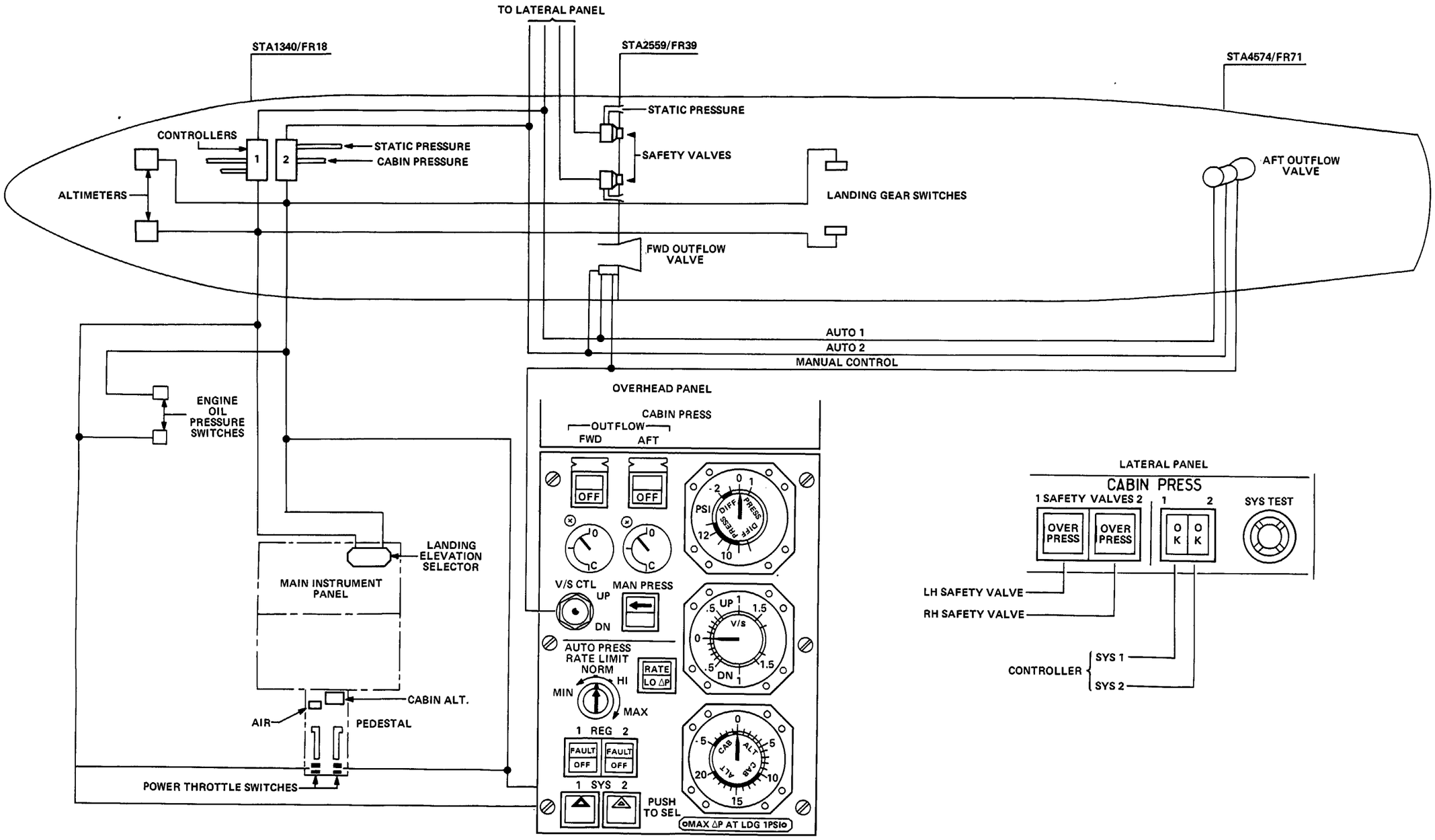
Cabin Pressure Control - Component Location
Figure 003

R **ON A/C ALL

R 3. System Description
R The pressure control system is a fully automatic, electrically operated
R system. It consists of two identical, independent, automatic systems opera-
R ting two outflow valves only, one situated forward of the air conditioning
R compartment and the other aft of the bulk cargo compartment.
R Each valve is operated by one of three electric motors, two of these motors
R are controlled independently by the two automatic systems, the third (the
R manual system) is controlled by a toggle switch located on the overhead panel
R in the flight compartment. In each valve, the drive mechanism and butter-
R fly valve are common to both systems and the two automatic systems will
R alternately operate both valves. Each system is used alternately for each
R flight, the changeover being effected automatically between flights. In the
R event of a system failure, automatic transfer to the other system will occur.
R The system function is dependent on pre-programmed cabin pressure altitude,
R aircraft altitude and preselected landing altitude. This information is re-
R layed to the cabin pressure controller of either of the two systems selected.
R These units also automatically control prepressurization and depressurization
R procedures. The control box function comprises microprocessor controlled
R digital circuitry including BITE (built-in test equipment).
(Ref. Fig. 004)



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Pressurization Control System Diagram
Figure 004

4. Component Description

A. Outflow Valves
(Ref. Fig. 005)
(Ref. Fig. 006)

(1)General

Both of the automatic systems operate the cabin pressure outflow valves, the function of which is to control cabin air evacuation.

(2)Description

Each valve is of the butterfly type and consists of a light alloy case with convergent intake. The operating principle of the valve is based upon the application of a triple actuator system comprising :

- a planetary type reduction gearbox with two irreversible drives,
- a double-rotor, brushless DC motor powers one drive for the automatic control mode systems 1 and 2,
- a standard DC motor powers the other drive for the manual emergency control mode.

The valve also features an electronic controller mounted on the valve body. It is an autonomous unit capable of following position instructions given by a signal from the system controller and performs the following functions :

- the locking in position by SYS 1(2) automatic system,
- producing a signal for valve position indication.

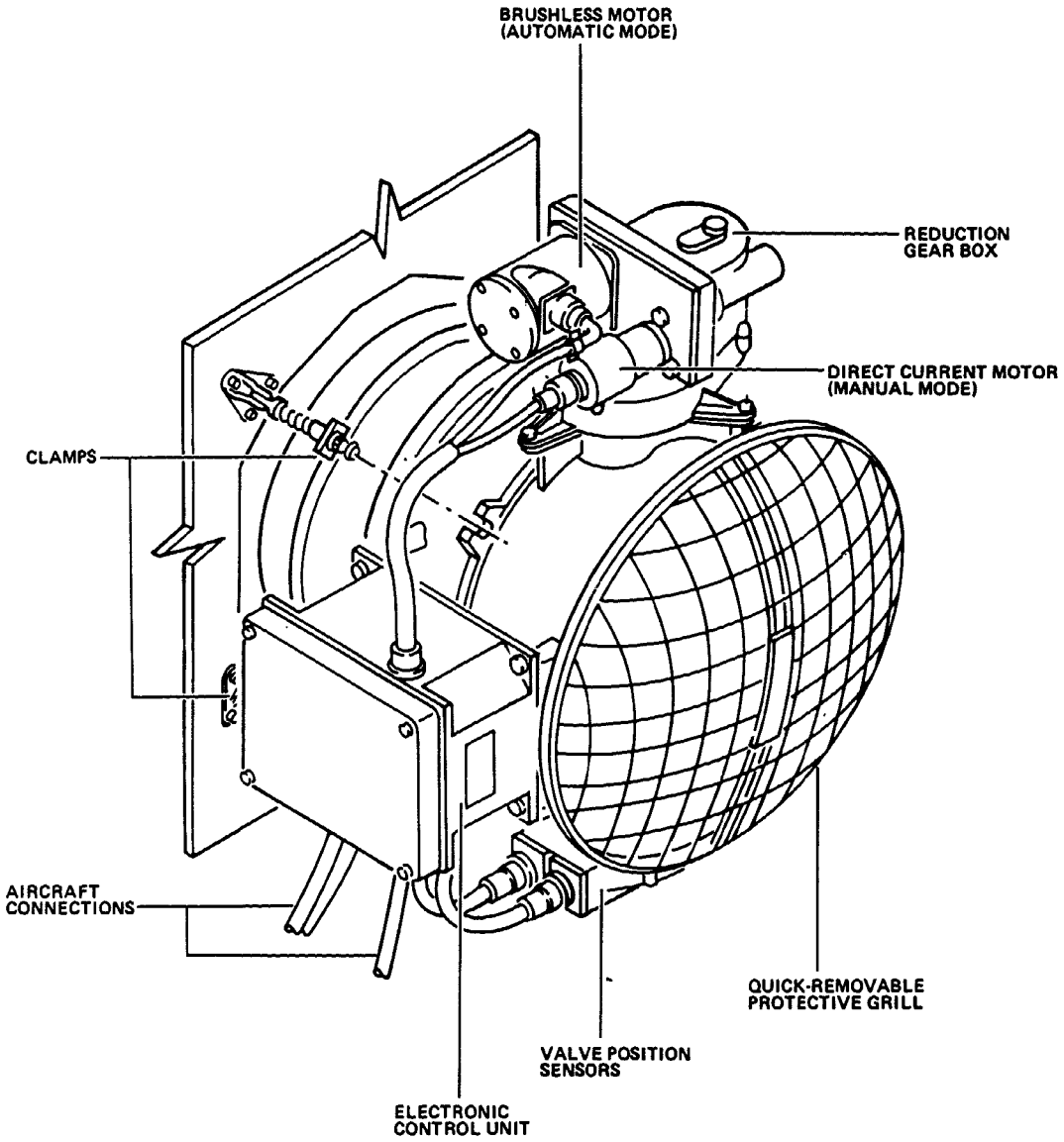
(3)Operation

(a)General

When operating in the normal automatic mode (SYS 1 or SYS 2), the appropriate motor on the double motor drive is activated driving the irreversible worm gear. This drives the ring gear and since the sun gear remains stationary, the planet gear assembly rotates driving the output gear which is connected to the butterfly by a linkage coupling. Should both automatic systems fail, the single motor drive is activated by operating the manual toggle switch located on the flight compartment overhead panel. This motor drives a second irreversible worm gear which drives the tangent gear connected to the sun gear. Since the ring gear is now stationary, the sun gear drives the planet gear assembly producing the same function therefore as in the automatic mode.
The locking in position is controlled by the valve electronic controller. The locking system comprises a position detector loop, an operating direction control logic and a phase switch logic based on information supplied, by opto-electronic detectors located on the motor itself. The entire function is duplicated to ensure the independence of both automatic systems.
The connections between the valve electronic controller and rotor position detectors, and the switching for the motor windings is effected over a very short distance, ensuring immunity to various electrical interferences. The connection between power electronics and motor windings as well as the position copier, also benefit from the same advantages.

(b)Motor control

The drive motor in automatic mode service is a brushless DC motor in which switching is effected by the optical coding of the rotor posi-



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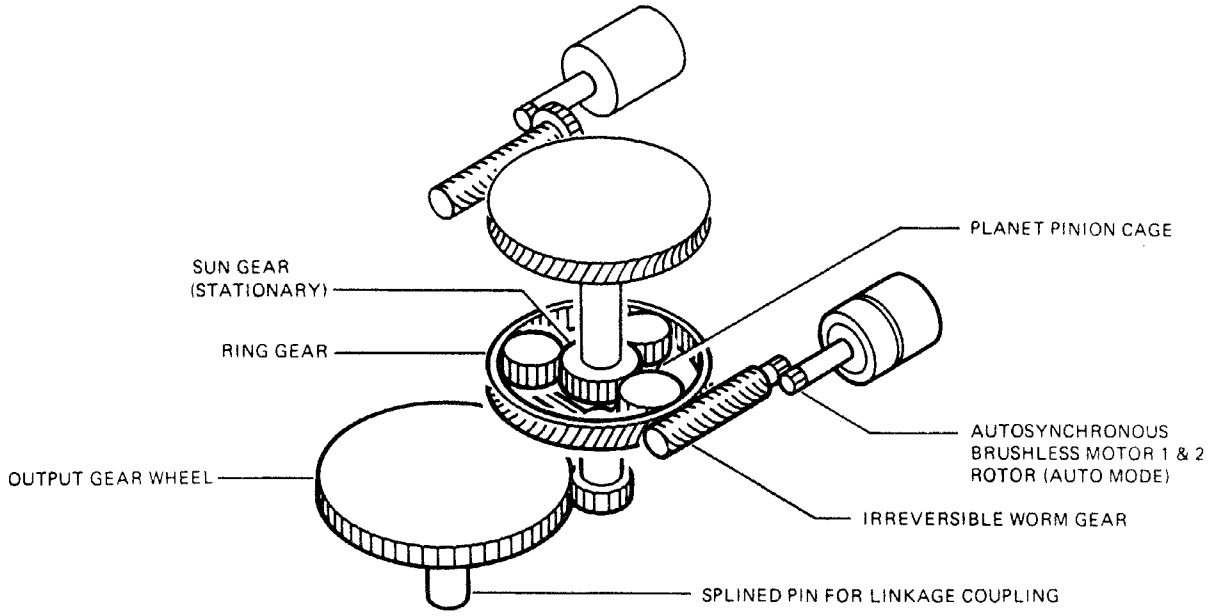
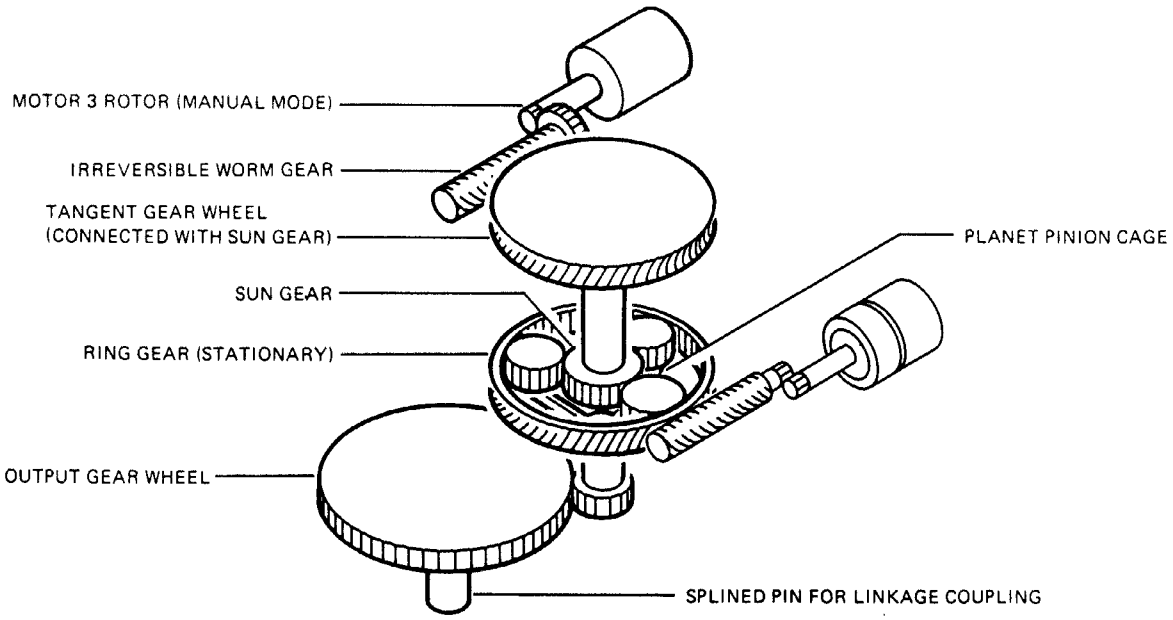
Outflow Valves
Figure 005


PLANET PINION CAGE
SUN GEAR (STATIONARY)
RING GEAR
AUTOSYNCHRONOUS BRUSHLESS MOTOR 1 & 2 ROTOR (AUTO MODE)
OUTPUT GEAR WHEEL
IRREVERSIBLE WORM GEAR
SPLINED PIN FOR LINKAGE COUPLING

AUTO MODE DRIVE SYS 1 & 2



MANUAL MODE DRIVE - EMERGENCY OPERATION

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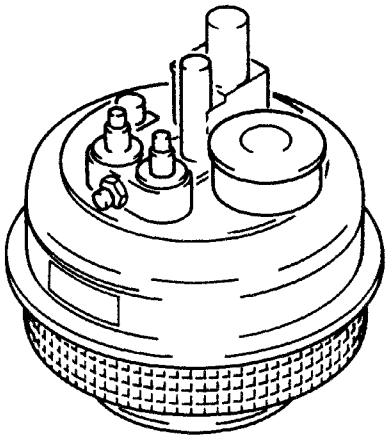
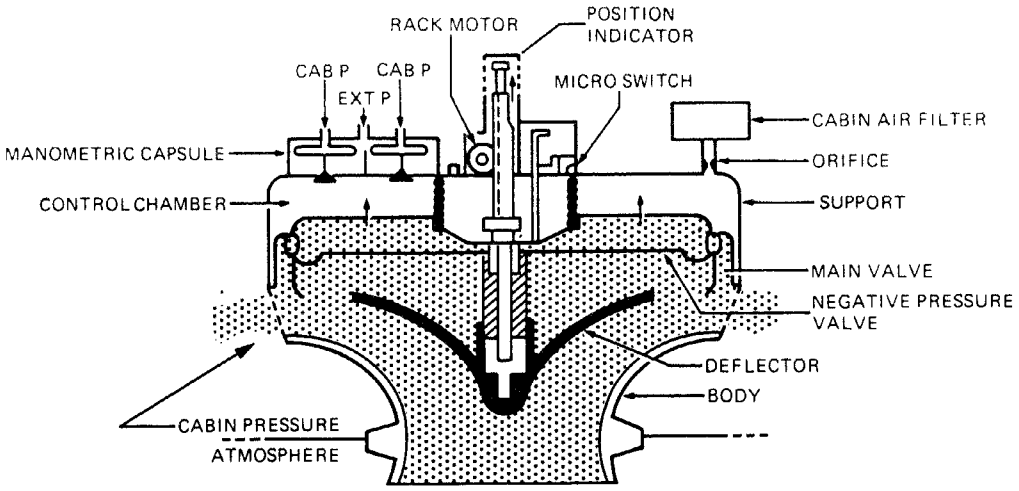
Outflow Valve Drive Schematic
Figure 006

tion. For this purpose, the rotor is integrated with a metal mask in two sectors, dividing the rotation into twelve 30° stages.
The DC motor combines two essential advantages :
1 The torque-speed of the DC permanent magnet motor.
The considerable torque available at start-up provides a highly dynamic control and eliminates the danger of blockage in the valve (due to freezing, nicotine deposits, etc.).
2 The operational reliability, comparable with that of AC motors and step-by-step motors, and in addition an appreciable saving in size, weight and energy (low thermal dissipation and consumption) as in the case of motors which must supply considerable torque.
The information from the opto-electronic detectors is transferred to the control logic which decodes, memorizes, if required, and generates the control signals for the power stages. The control logic is validated by signals from the electronics, processing command and feedback voltages.
The electronics compare, after amplification, the difference between instruction and copy voltage at predetermined threshold values in order to generate three signals :
- motor direction,
- motor shut-down,
- memory validation.
A window comparator detects the correct position of the valve and gives the orders to stop and to decelerate.
The memory has a stabilizing effect which reduces the influence of jolts on the gear train of the reducer as well as the start-up signalling currents. An electronic torque limiter is installed in the power section.
For position indication purposes, an electronic circuit based on the linear stage of a triple potentiometer in the valve, generates a current proportional to the position of the valve. This calibrated current is supplied to the corresponding valve position indicator on the flight compartment overhead panel and to the ECAM display unit.

B. Safety Valves
(Ref. Fig. 007)
(1)General
Two safety valves are installed in the pressurized area at STA2241(FR39).
They operate independently and perform the following safety functions :
- over-pressure safety (positive differential pressure)
- negative pressure safety (negative differential pressure)
Apart from these two essential safety functions, each of the valves contains an electrical device to transmit valve position indication signals to the ECAM display unit, to provide a positive indication of differential pressure safety operation.
Since both valves are installed below the aircraft floating line they are fitted with a rack device to hold the poppet in the shut position in the event of ditching.
(2)Operation
Two manometric capsules detect the cabin (ambient) differential pressure. When this pressure is too high the capsules cause the valve to open





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Safety Valves
Figure 007

limiting the differential pressure to 638 mb (maximum limit 610 ± 7 mb setting pressure, 610 ± 14 mb system pressure). Should the external (static) pressure be greater than the cabin pressure, a negative pressure diaphragm is activated which causes the valve to open at a differential pressure of 35 mb (maximum possible differential pressure 70 mb).
In the event of ditching, the OUTFLOW pushbutton switches on the CABIN PRESS panel 432VU are selected OFF supplying power to the rack actuators of each safety valve. This causes a rack to move down until a stop contact and limit switch is reached.

C. Cabin Pressure Controllers
(Ref. Fig. 008)

(1)General

The cabin pressure controllers, mounted on the R electronics rack 90VU in the avionics compartment, are electronic devices intended to optimize at any time the pressure build-up in the cabin while keeping the pressure fluctuation amplitudes to a level compatible with passenger crew comfort.
The system comprises a program whereby the true cabin altitude equals or tends to equal the scheduled cabin altitude. The crew workload is reduced to a minimum on ground and in flight since no selection tasks are required during the climb, cruise and descent cabin configurations.
The pressure controller automatically controls in flight and on the ground the valves so that variations of pressure prevailing in the cabin are in compliance with :
- the physiological comfort requirements,
- the aircraft environmental conditions during landing and ground configurations.

The pressure controller elaborates signals sent to indicator lights, providing good operation or fault indication throughout the pressure control system.

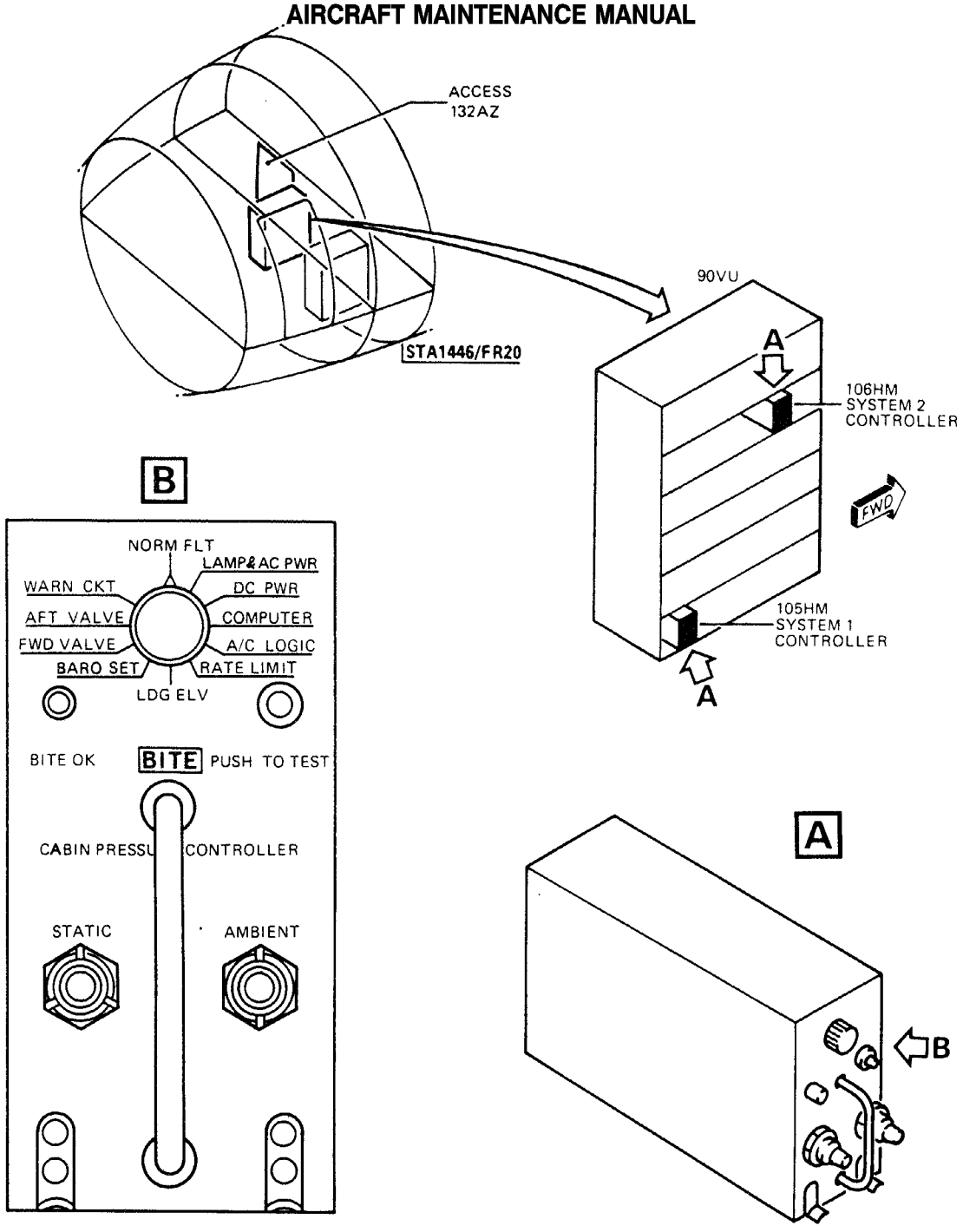
(2)Description

Each cabin pressure controller is a micro-processor based unit housed in a 3MCU wide module to ARINC 600 standard. The controller body is made of cast light alloy and its two side panels of stamped aluminum. All control elements are displayed on the controller front face. The aircraft electrical interface connection is made through a connector fitted to the casing rear face.

(3)Operation

The cabin pressure controller provides the three following main functions :
- the pressure control function,
- the alarm function (Ref. 21-00-00, ECAM system : CAPT and F/O main instrument panels and left ECAM display unit pages),
- the self-monitoring function.

During normal automatic control, the selected controller entirely covers the cabin pressure control function, mainly in accordance with the aircraft flight plan, taking into account the fixed limits of the cabin rate of change and maximum differential pressure between the ambient and static conditions.
The system incorporates three types of test functions :



BM5 21 31 00 0 BHMO 08

Cabin Pressure Controllers
Figure 008

- one enabling the continuity of electrical circuits and connections to be checked, which is controlled from the maintenance panel,
- one within the controller enabling correct operation of the control circuit to be checked, which is automatically engaged at regular time intervals of less than one second. This test allows the following circuits to be checked :

Internal
- control processing unit (by watch dog)
- programmable, read only memory (check sum algorithm)
- random access memory (safety, write, read, deliver)
- multiplexors, analog/digital convectors
- electrical power supply unit
- pressure sensors accuracy (aircraft on the ground only)
- coherent electrical signals delivered by the pressure sensors
- outflow valve motor control (aircraft on the ground only)
- safety valve control (aircraft on the ground only)

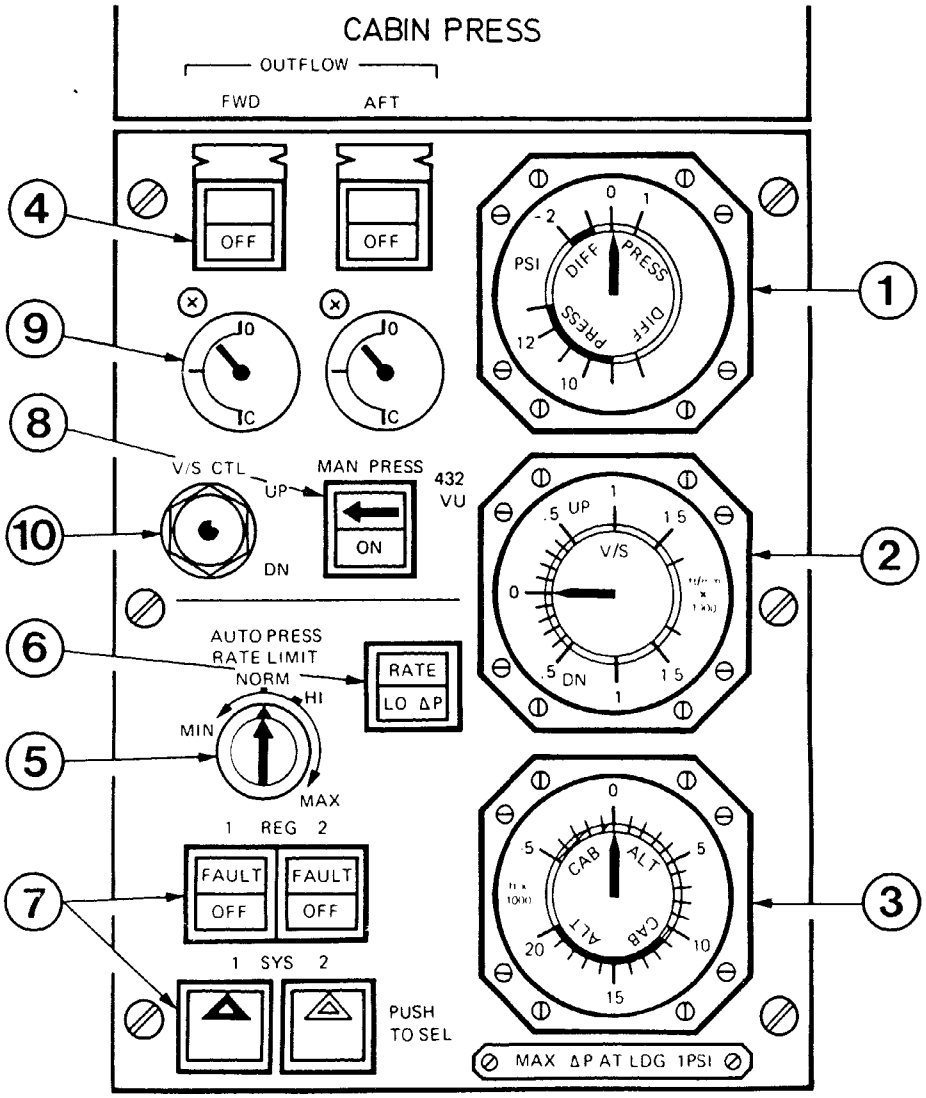
External interface connection
- landing elevation
- baro correction
- rate limit
- valve position indication (aircraft on the ground only)
- outflow valve motor wiring (aircraft on the ground only)
- landing gear switches (aircraft on the ground only)
- one failure segregation test facility (**BITE**) operated from the controller front face through manual operation of rotary selector switch.

The switch positions and tests are described in the following table :

SELECTOR POSITION	TEST
NORM FLT	- no **BITE** test performed in this position
LAMP & AC PWR	- test of **BITE OK** indicator light - test of **115VAC** aircraft power supply
DC PWR	- test of **28VDC** aircraft power supply
COMPUTER	- test of controller internal functions and elements
A/C LOGIC	- test system general configuration on the ground
RATE LIMIT	- test of **RATE LIMIT** selector circuit
LDG ELV	- test of **LANDING ELEVATION** selector circuit
BARO SET	- test of barometric correction circuit
FWD VALVE	- test of forward cabin pressure outflow valve motor circuit
AFT VALVE	- test of aft cabin pressure outflow valve motor circuit
WARN CKT	- test of aircraft circuit warning lights

5. Controls and Indicators

A. Overhead Panel 432VU : CABIN PRESS
(Ref. Fig. 009)
(1)Cabin differential pressure indicator



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CABIN PRESS Panel
Figure 009

The indicator indicates the differential between cabin and static pressure, from -2 to 1 and from 8 to 13. The scale is graduated in psi for reading limiting values.

- The cabin differential pressure indicator tolerance is plus or minus 0.2 psi.
- The ECAM indication tolerances are :
  . 0.15 psi for the cabin pressure controller
  . 0.075 psi for the System Data Acquisition Concentrator (SDAC)
  . 0.05 psi for the Symbol Generator Unit (SGU).
  The accuracy of the ECAM loop is plus or minus 0.275 psi.
- The accumulated difference between indicator and ECAM is plus or minus 0.475 psi.

(2)Cabin vertical speed indicator

The indicator indicates cabin rate of change in terms of vertical speed in ft/mn, the scale is graduated in 100 ft steps with numbers relative to 1000 ft/mn.

In case of excessive cabin altitude rate of change, MASTER CAUTION lights flash on CAPT and F/O main instrument panels.

(3)Cabin altimeter

The altimeter indicates cabin pressure altitude based on ISA pressure 1013 mbar, the scale is graduated in 1000 ft. steps from -5 to 20. In case of excessive cabin altitude, MASTER CAUTION and MASTER WARNING lights flash on CAPT and F/O main instrument panels.

The ECAM indications provided by the cabin pressure controller in control (SYS 1 or SYS 2) are used during the normal regulation.

The cabin altimeter (41HM) is used only in manual mode (MAN).

Both the ECAM and cabin altimeter (41HM) display the cabin altitude and they have their own tolerances :

- CPC/SDAC/SGU (ECAM) : ± 490 ft.
- cabin altimeter (41HM) : ± 200 ft. for a nominal altitude from -1000 ft. to +5000 ft.
  ± 300 ft. for a nominal altitude from +5000 ft. to +15000 ft.
  ± 500 ft. for a nominal altitude from +15000 ft. to +20000 ft.

As a consequence, the difference between the two values shown on ECAM and cabin altimeter (41HM) is 990 ft. maximum.

(4)OUTFLOW/FWD and AFT pushbutton switches

Releasing the pushbutton switch causes electrical closure of the outflow valve, OFF legend comes on. If both pushbutton switches are released (out), the aircraft is in the ditching configuration with the consequent closure of the following :

- the two outflow valves
- the two refrigeration unit packs
- the overboard extract valve (if open)
- the emergency ram air inlet (if open)
- the two safety valves.

(5)RATE LIMIT selector

The maximum automatic cabin rates of change when selector is set to one of the following positions are :

(a)Position MIN

-70 ft./mn descent and +100 ft./mn climb.

(b)Position **NORM**

-350 ft./mn descent and +500 ft./mn climb.

(c)Position **HI**

-470 ft./mn descent and +1130 ft./mn climb.
This position is used when the **NORM** position proves insufficient with respect to **ATC** clearances.

(d)Position **MAX**

-1170 ft./mn descent and +1670 ft./mn climb.
The cabin pressure controller always gives the lowest possible rate of change.

(6)**RATE/LO ΔP** annunciator

RATE legend comes on when **RATE LIMIT** selector is not in the **NORM** position.
LO ΔP legend comes on when :
- cabin differential pressure is below 0.7 psi (50 mb)
- aircraft rate of descent is above 2000 ft/mn
- cabin altitude is 1500 ft above landing altitude selected.

This annunciator advises when an excessive cabin rate of descent is used during descent.

(7)**AUTO PRESS** system operational pushbutton switches

REG 1 (2) pushbutton switches
- both pushbutton switches pressed in, automatic pressure control is ensured. Operative system is indicated by illumination of triangle on **SYS 1 (2)** pushbutton switch
- **OFF** legend comes on if the pushbutton switch is released (out). This system is then rendered inoperative and cannot be automatically selected. If both system **OFF** legends come on, arrow on **MAN PRESS** pushbutton switch (8) comes on.
- **FAULT** legend comes on when :
- outflow valves closed, corresponding **OUTFLOW** pushbutton switch **OFF** legend is on
- system controller not energized
- cabin altitude > 8700 ft and vertical speed indicator indicates climb for more than 5 seconds, outflow valves open and altitude selected is less than 8000 ft
- cabin differential pressure exceeds 8.45 psi (582.6 mb).
- cabin rate of change is greater than 2000 ft/mn descent. If there is a fault of selected system (**SYS 1, SYS 2** pushbutton switches) then automatic transfer to the other system will occur.

SYS 1 (2) pushbutton switch
- triangle comes on indicating the operative system (automatic change over at each engine start and in case of failure). Alternative system may be selected manually by pressing the appropriate pushbutton switch.

(8)**MAN PRESS** pushbutton switch

Arrow comes on when **OFF** legends on both **REG 1** and 2 pushbutton switches are on. When **MAN PRESS** pushbutton switch is pressed (in), the **ON** legend comes on and manual control is operative. Manual control of the outflow valves is then operated by **V/S CTL** switch (10).

(9)Outflow valve position indicators

Valve fully closed - C

Valve fully open - 0

(10) **V/S CTL** switch

Manual control of the outflow valves is activated when the arrow comes on or the **MAN PRESS** pushbutton switch is pressed (in) and the **ON** legend is on.

Valves open - **UP**

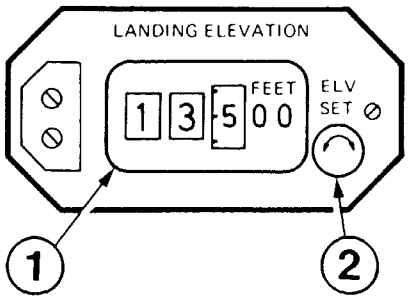
Valves close - **ON**

The switch is spring-loaded in the **CABIN PRESS** neutral position.

B. Center Instrument Panel - **LANDING ELEVATION** Selector
This instrument serves as an input to the pressure controllers, to bring the cabin pressure to the lower of selected and landing altitude and programmed pressure, consistant with a cabin rate of change, as a function of external rate, and with authorized maximum cabin pressure differential. (Ref. Fig. 010)

C. Maintenance Panel 471VU
(Ref. Fig. 011)
The pressurization systems are tested one at a time as selected by the **SYS 1 (2)** pushbutton switches on the **CABIN PRESS** panel **432VU.**
When the **SYS TEST** pushbutton is pressed and held, the active system is tested. Respective **OK** legend comes on provided :
- electrical circuits, integrity of controller and valves are satisfactory,
- all indications of **ECAM** system are satisfactory.

When the pushbutton switch is released (out) the warnings are de-activated and **OK** legend goes off.
SAFETY VALVES 1 (2) MFA
A Memorized Fault Annunciator **(MFA)** is provided in the **CABIN PRESS** section of the maintenance panel to store a fault signal should a valve malfunction occur. Placing the **OFF/READ/TEST** switch **(472VU)** in the **READ** position, all **MFAs** having a stored signal will come on. Pressing the **MFA RESET** pushbutton switch will erase all stored signals.
NOTE : The above tests are normally carried out by maintenance personnel on the ground.



(1) LANDING ELEVATION COUNTER
THE SETTING OF THE LANDING ELEVATION IS DISPLAYED IN HUNDREDS , THOUSANDS AND TEN THOUSANDS OF FEET .

(2) ELEVATION SET (ELV SET) KNOB
BY ROTATION OF THE KNOB , THE ELEVATION OF THE PLANNED DESTINATION AIRPORT IS SET BEFORE TAKEOFF USING THE NEAREST HUNDRED FEET FOR INTERPOLATION .

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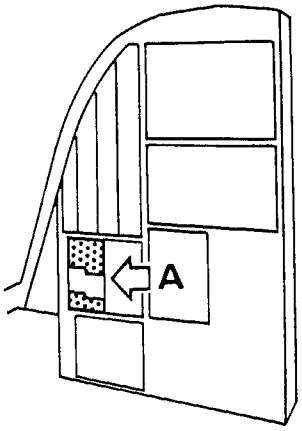
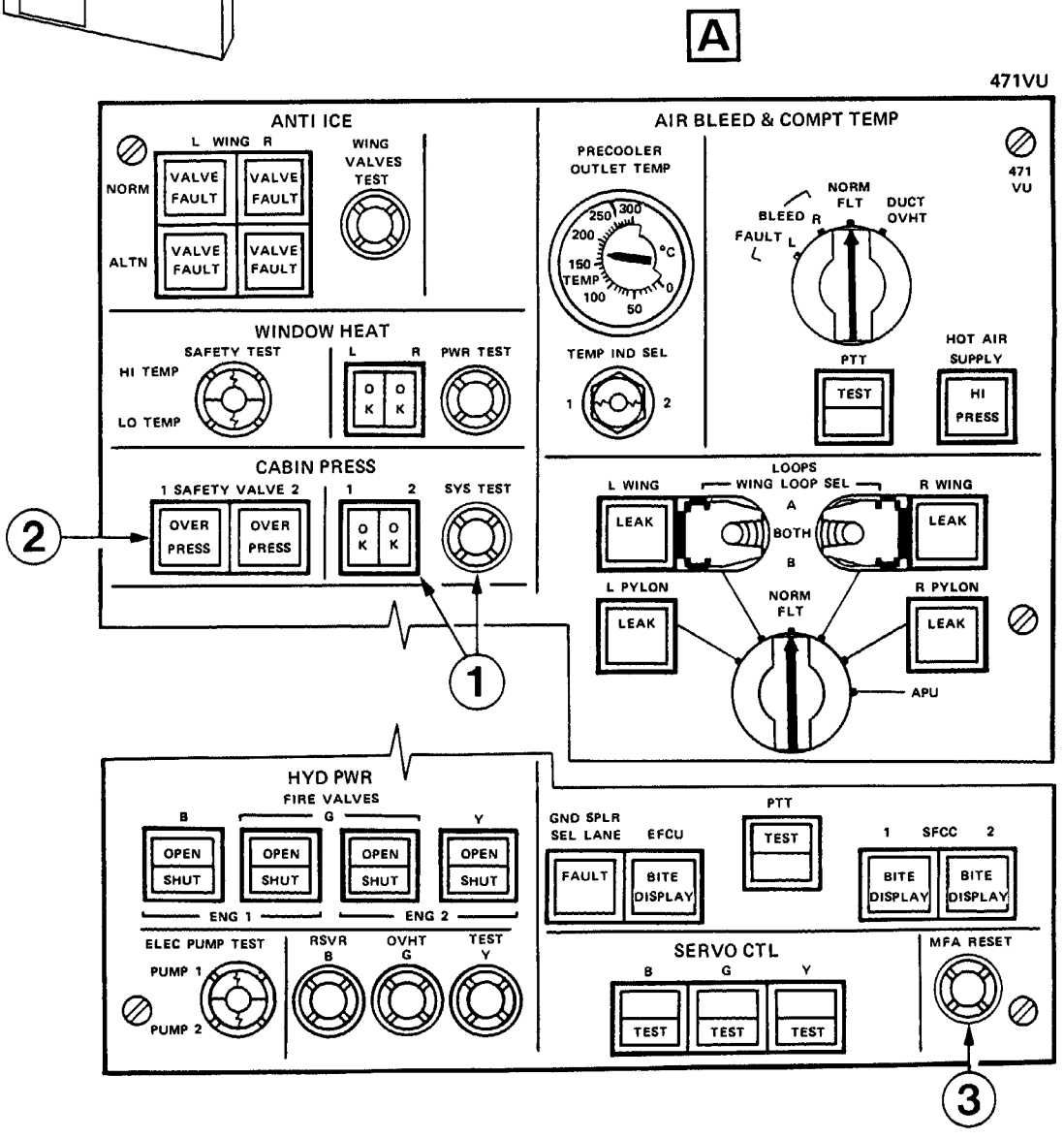
LANDING ELEVATION Selector
Figure 010





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CABIN PRESS Section oF Maintenance Panel 471VU
Figure 011

6. Operation

A. General (Ref. Fig. 012)
Pressurization of the cabin is a normal procedure before takeoff to prevent a noticeable pressure fluctuation in the cabin during rotation at takeoff. To achieve this prepressurization, when one of the throttles is advanced beyond the 22° position before takeoff, the outflow valves are closed and the cabin rate of change is set at 500 ft/mn until the cabin differential pressure reaches 15 mbar. Prepressurization is maintained for 15 seconds after takeoff, when the cabin pressure control is then automatically switched to its normal inflight mode. Depressurization after landing is also automatically controlled to prevent any sudden depressurization should the landing altitude selector be incorrectly set. The rate is set at 500 ft/mn for 45 seconds, after which the outflow valves are fully opened. Cabin excess pressure and negative excess pressure are prevented by the automatic functions of two safety valves. In the event of failure of both automatic systems, the cabin pressure is controlled manually by a toggle switch located on the **CABIN PRESS** section of overhead panel.
The only crew action required in normal operation will be to set the altitude of the destination landing field on the **LANDING ELEVATION** selector located on the main instrument panel, before takeoff.

B. Programming Elaborated with the Automatic Controller
The controller elaborates a theoretical cabin altitude evolution law, i.e. Zc TH. This law is a function of aircraft altitude (Za) and is computed by taking the maximum aircraft performances into account ; it is represented by the following formules :

AIRCRAFT ALTITUDE Za (ft)	THEORETICAL CABIN ALTITUDE Zc TH (ft)
<9800	0.29 Za - 2800
9800<Za <36500	0,24 Za - 2400
36500<Za <39000	0,34 Za - 5800
>39000	0,31 Za - 4810

This law is elaborated in digital terms so as to reach the normal maximum differential pressure as soon as the aircraft rate of climb is compatible with a cabin rate of climb lower than or equal to 500 ft/mn, while the aircraft is climbing at its maximum performance.
NOTE : The coefficients quoted above are given for better understanding only and are approximate figures.

R **ON A/C ALL

R Post SB 21-2062 For A/C ALL

R The pressurization systems are tested one at a time as selected by the
R SYS 1 (2) pushbutton switches on the CABIN PRESS panel 432VU.
R When the SYS TEST pushbutton switch is pressed and held, the active system
R is tested. Respective OK legend comes on provided :
R - electrical circuits, integrity of controller and valves are satisfactory,
R - all indications of ECAM system are satisfactory.
R When the pushbutton switch is released (out), the warnings are de-activated
R and OK legend goes off.
R SAFETY VALVES 1 (2) MFA
R A Memorized Fault Annunciator (MFA) is provided in the CABIN PRESS section
R of the maintenance panel to store a fault signal should a valve
R malfunction occur. Placing the OFF/READ/TEST switch (472VU) in the READ
R position, all MFAs having a stored signal will come on. Pressing the
R MFA RESET pushbutton switch will erase all stored signals.
R NOTE : The above tests are normally carried out by maintenance personnel
R on the ground.

R 6. Operation

R A. General (Ref. Fig. 013)
R (1)Pressurization of the cabin is a normal procedure before takeoff to prevent a noticeable pressure fluctuation in the cabin during rotation at takeoff.
To achieve this prepressurization, when one of the throttles is advanced beyond the 22° position before takeoff, the outflow valves are closed and the cabin rate of change is set at 500 ft/mn until the cabin differential pressure reaches 15 mbar. Prepressurization is maintained for 15 seconds after takeoff, when the cabin pressure control is then automatically switched to its normal inflight mode.
R (2)Depressurization immediately after landing permits the flight crew to operate in manual mode at any time, except when discrete spoiler signals are true.
When this occurs, two relays override the manual mode and force the two outflow valves to open to the fully position. Depressurization after landing is also automatically controlled to prevent any sudden depressurization should the landing altitude selector be incorrectly set. The rate is set at 500 ft/mn for 45 seconds, after which the outflow valves are fully opened. Cabin excess pressure and negative excess pressure are prevented by the automatic functions of two safety valves. In the event of failure of both automatic systems, the cabin pressure is controlled manually by a toggle switch located on the **CABIN PRESS** section of overhead panel.
The only crew action required in normal operation will be to set the altitude of the destination landing field on the **LANDING ELEVATION** selector located on the main instrument panel, before takeoff.

R B. Programming Elaborated with the Automatic Controller
The controller elaborates a theoretical cabin altitude evolution law, i.e. Zc TH. This law is a function of aircraft altitude (Za) and is computed by taking the maximum aircraft performances into account ; it is represented by the following formules :

AIRCRAFT ALTITUDE Za (ft)	THEORETICAL CABIN ALTITUDE Zc TH (ft)
<9800	0.29 Za - 2800
9800< Za <36500	0,24 Za - 2400
36500< Za <39000	0,34 Za - 5800
>39000	0,31 Za - 4810

This law is elaborated in digital terms so as to reach the normal maximum differential pressure as soon as the aircraft rate of climb is compatible with a cabin rate of climb lower than or equal to 500 ft/mn, while the aircraft is climbing at its maximum performance.

R NOTE : The coefficients quoted above are given for better understanding
R only and are approximate figures.

R **ON A/C ALL

(Ref. Fig. 014)

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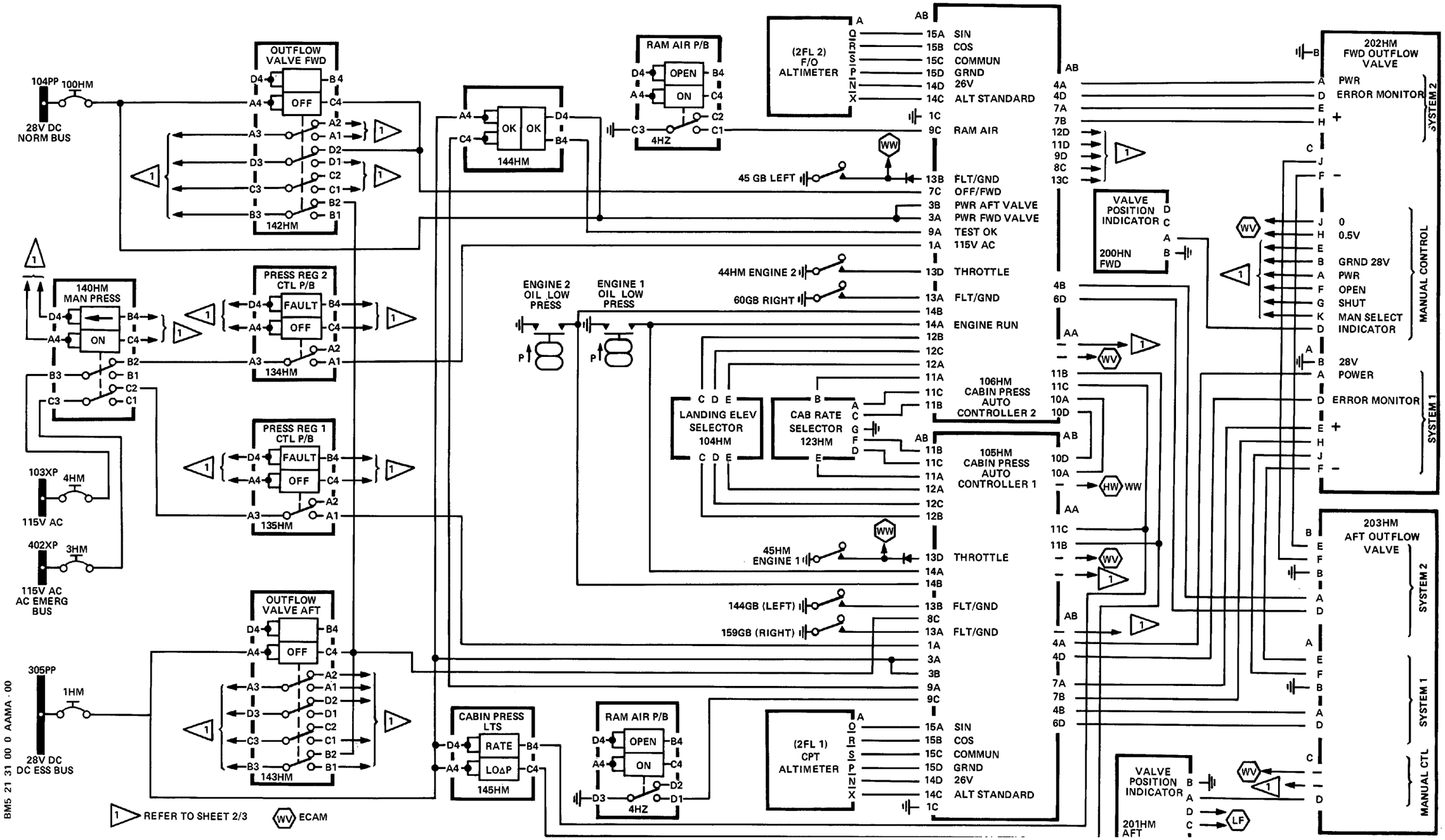
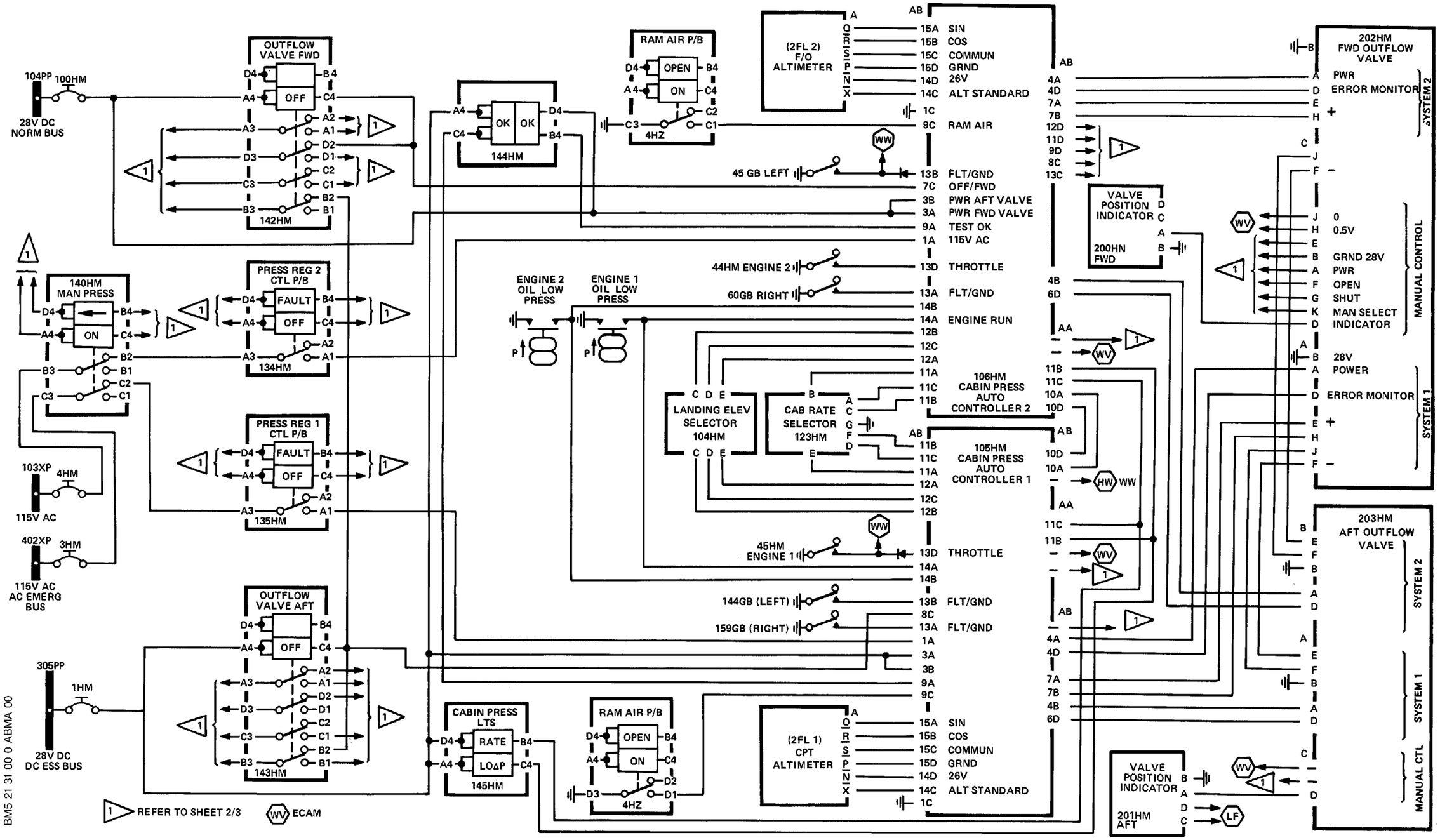


Cabin Pressure Control and Monitoring - Sheet 1/3
Figure 012



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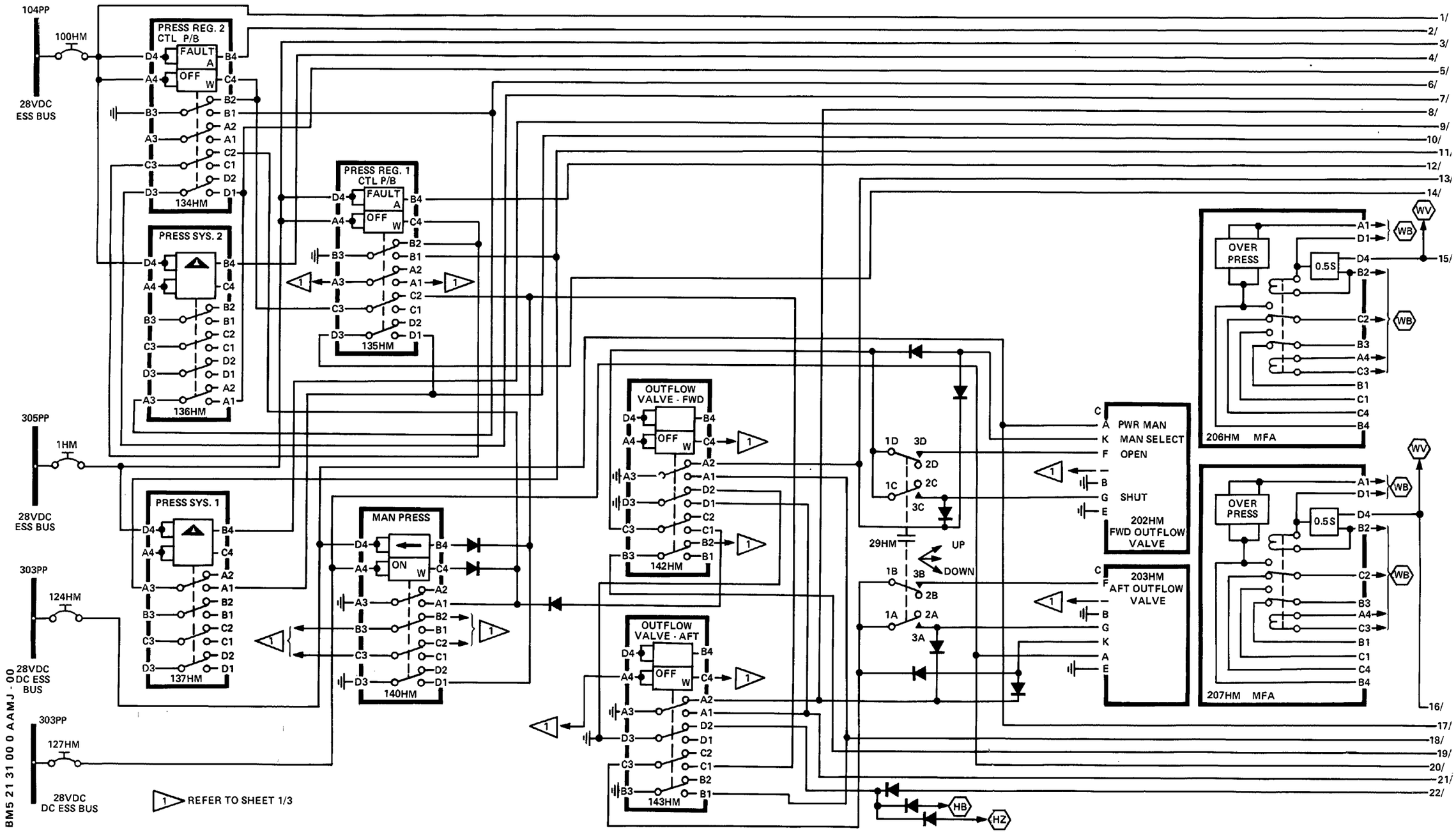
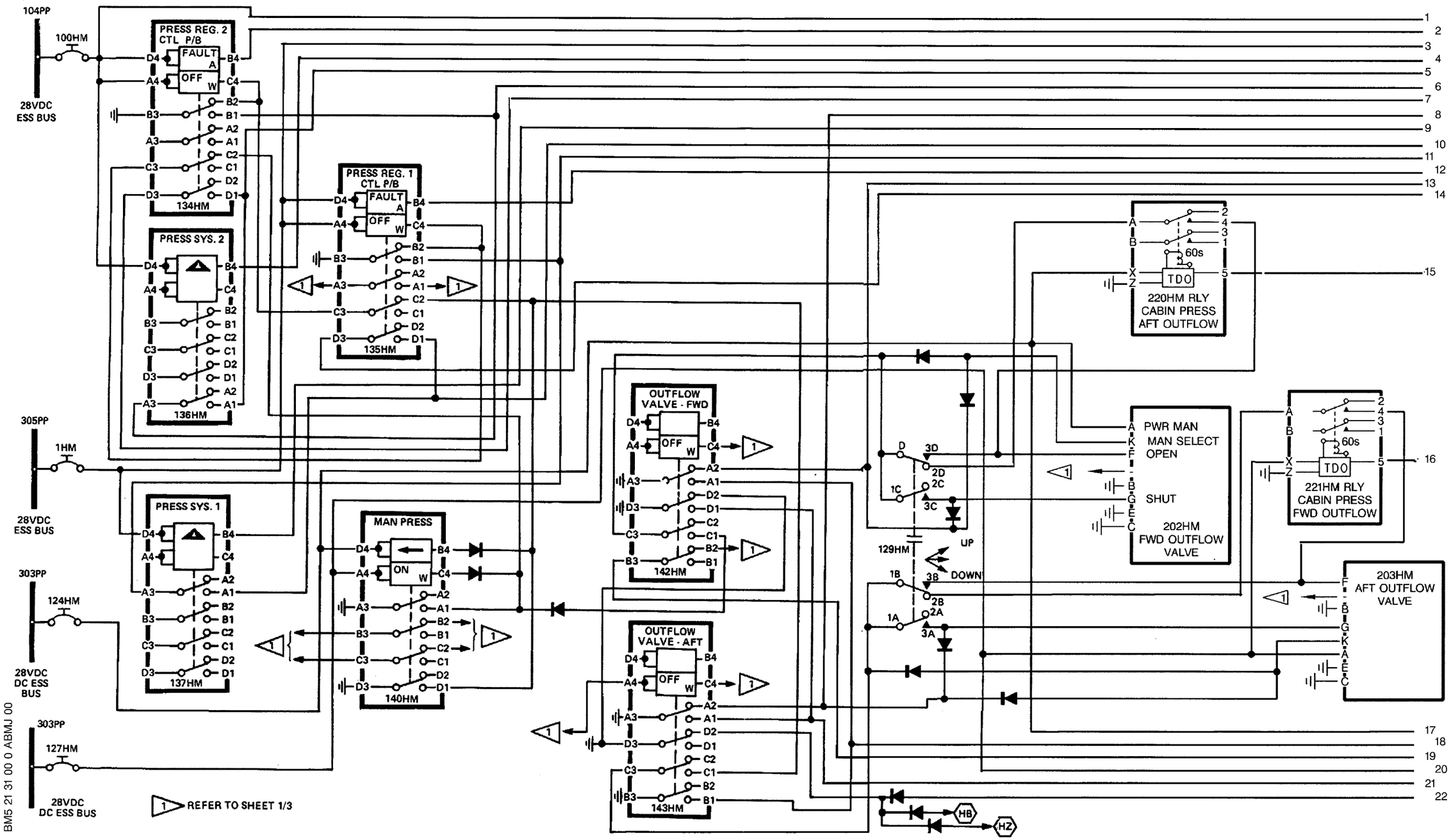
Cabin Pressure Control and Monitoring - Sheet 1/3
Figure 013

R



Cabin Pressure Control and Monitoring - Sheet 2/3
Figure 012



Cabin Pressure Control and Monitoring - Sheet 2/3
Figure 013

R

EFFECTIVITY: ALL

PIA

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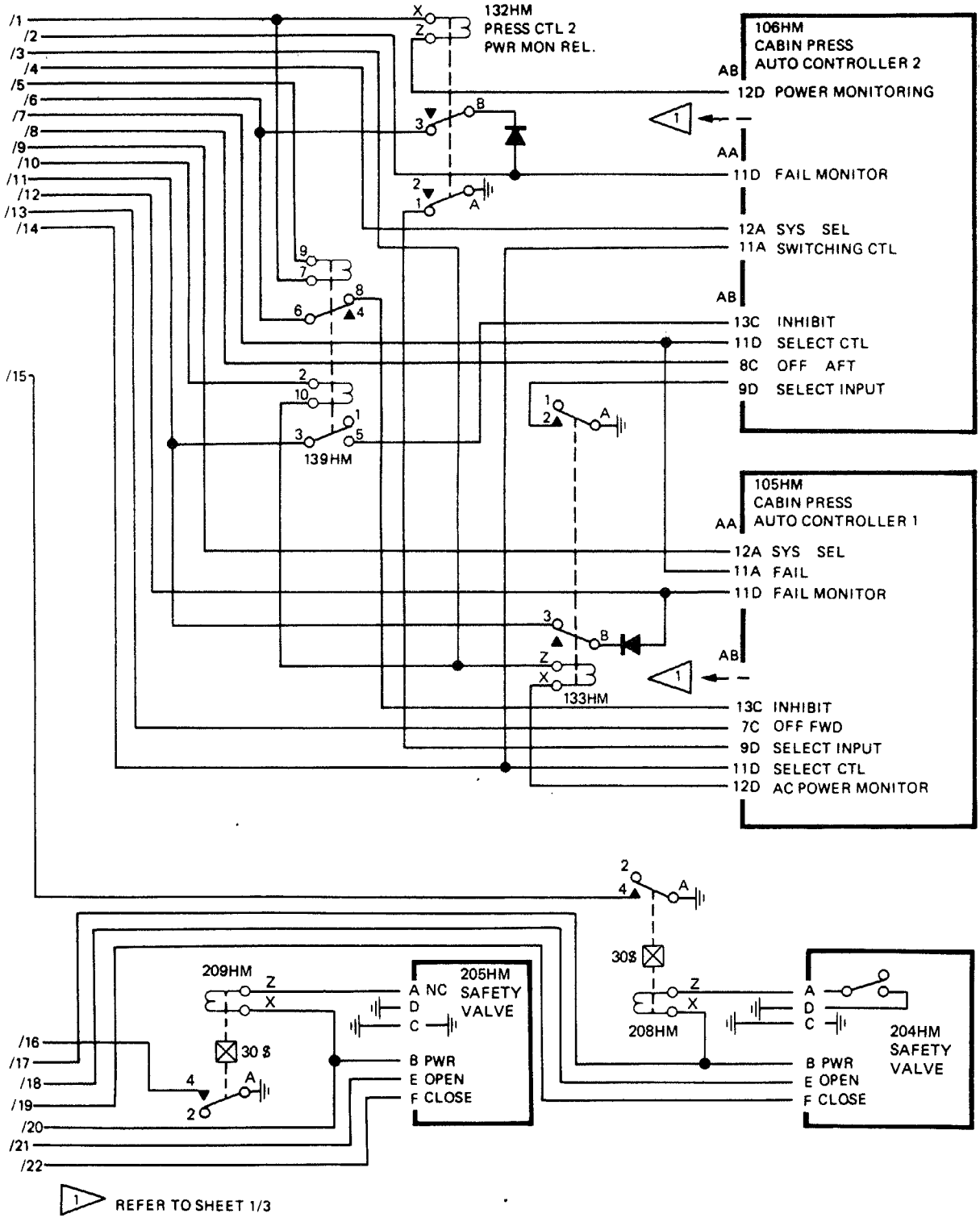

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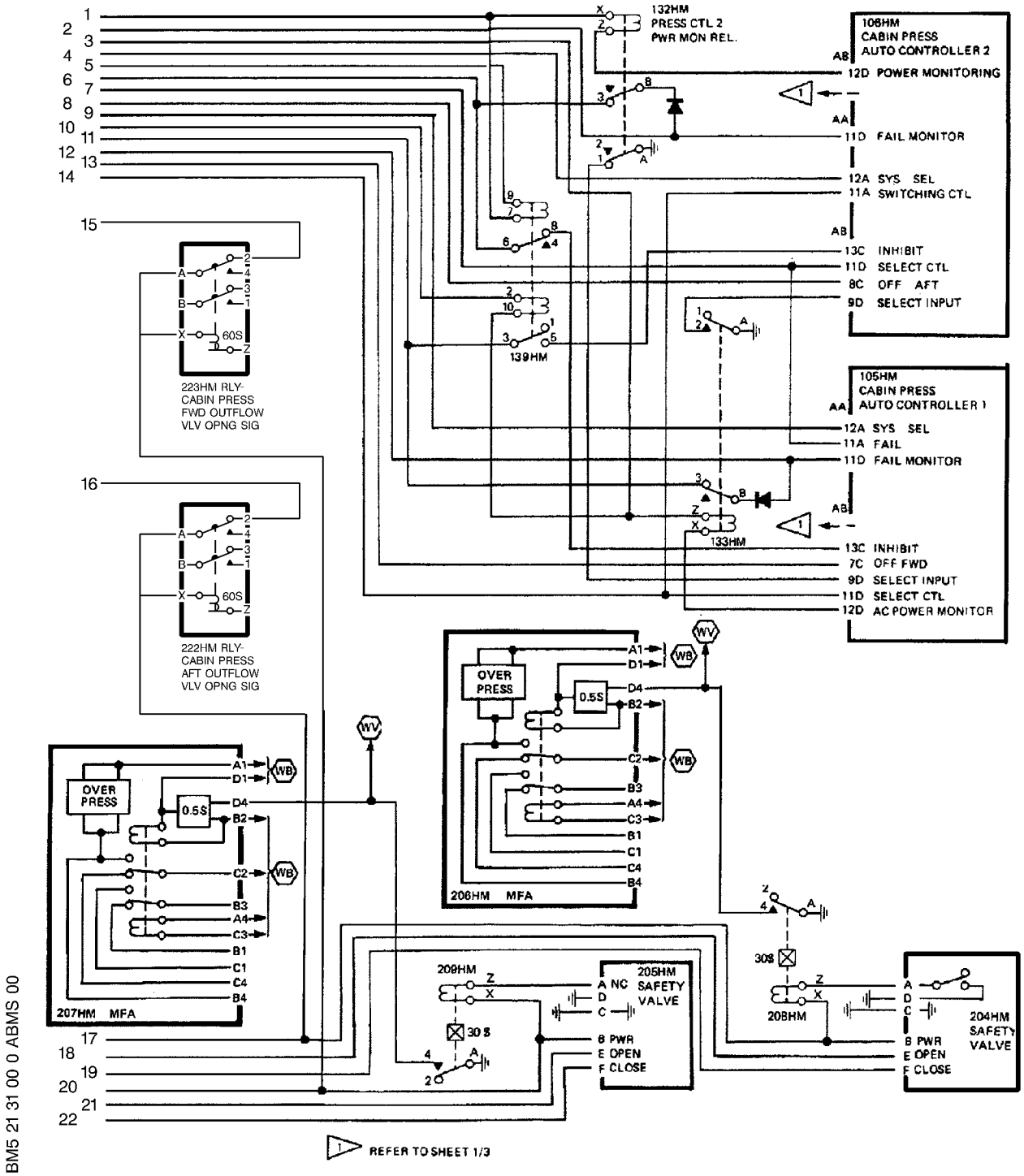
Cabin Pressure Control and Monitoring - Sheet 3/3
Figure 012



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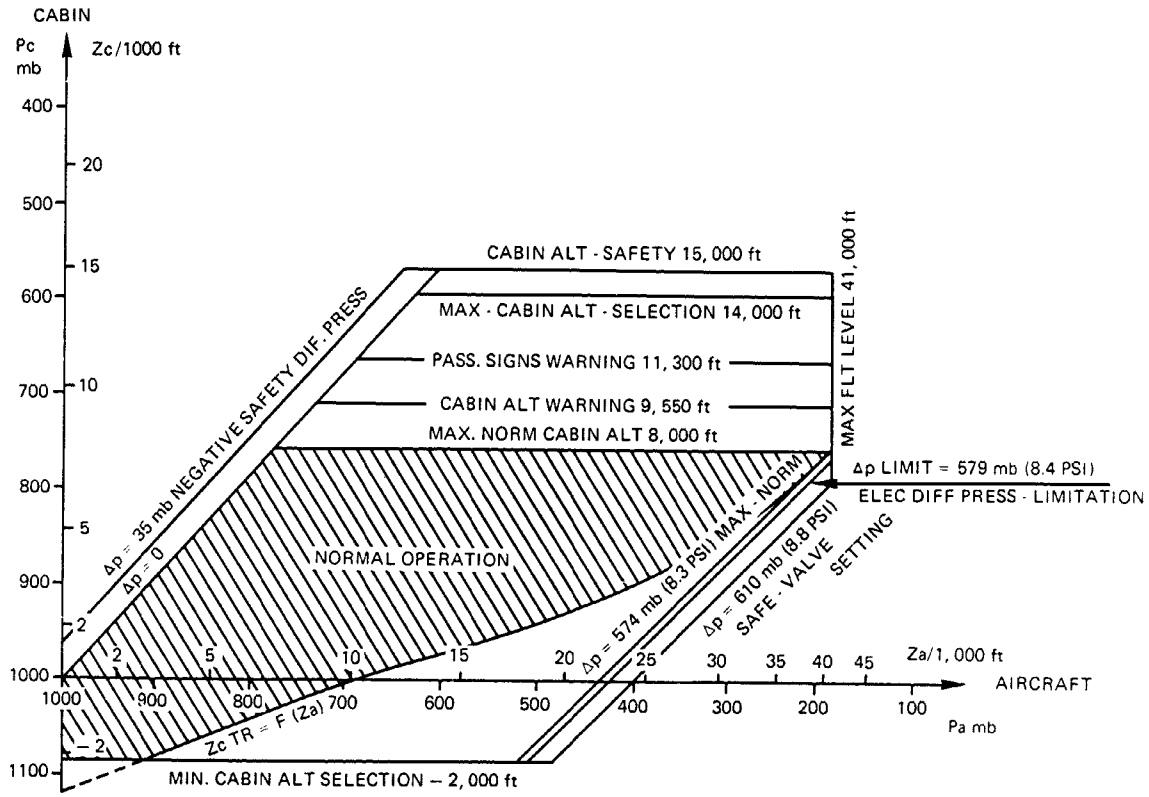
Cabin Pressure Control and Monitoring - Sheet 3/3
Figure 013

R



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Cabin Pressure Control Operational Envelope
Figure 014

1. Operational Test

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

CAUTION : TO PREVENT ACCIDENTAL PRESSURIZATION MAKE CERTAIN THAT :
- AT LEAST ONE FLT COMPT WINDOW OR CABIN DOOR IS OPEN AND REMAINS OPEN DURING TEST.
- IF THE A/C IS PARKED OUTSIDE AND IS NOT PROTECTED FROM THE RAIN, ONE MAINTENANCE DOOR SUCH AS 134AR, 136AR, OR AVIONICS ACCESS DOOP 121BL IS OPEN AND REMAINS OPEN DURING TEST.

A. Reason for the Job
- test of automatic system controls
- test of ditching configuration
- test of outflow valves to check MAN control
- test of pressurization and depressurization electrical sequences
- test of cabin pressure outflow valves opening (controlled by emergency ram air inlet)
- test of cabin pressure controller (test OK and BITE test)

R - test of cabin pressure control.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Warning Notice
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 79-34-11, P. Block 301	Low Oil Pressure Switch

C. Procedure

(1)Job set-up

(a)Circuit breakers closed, particularly those associated with CABIN PRESS, VENTILATION, HYDRAULIC (LDG GEAR/CTL, LDG GEAR/FLT/GND), ECAM, AIR BLEED.

(b)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(c)Make certain that electronics racks ventilation is correct.

NOTE : Energization of the aircraft electrical network causes the two cabin pressure outflow valves to open.

(d)Put a warning notice on FLT COMPT window, CABIN door or MAINTENANCE door to tell persons that the door must remain open to prevent accidental pressurization.

(e)Make certain that ENG1 and ENG2 throttle control levers are in forward idle throttle position.

(f)On COMPT TEMP panel 437VU
- RAM AIR pushbutton switch is released (out) (OPEN and ON legends are off).

(g)On CABIN PRESS panel 432VU
- OUTFLOW/FWD and AFT pushbutton switches are pressed (in) (OFF legends

are off).
- both outflow valves position indicators are in 0 position
- **AUTO PRESS/REG** 1 and 2 pushbutton switches are pressed (in) (**OFF** legends are off).
- **MAN PRESS** pushbutton switches is released (out).

(h)On **ECAM** control panel (center pedestal)
- using **RIGHT DISPLAY** knob, adjust brightness on **R ECAM** display unit
- press **PRESS** pushbutton switch
- pushbutton switch integral light comes on
- on **R ECAM** display unit, **CAB PRESS** page is displayed.

(i)On **R ECAM** display unit, on **CAB PRESS** page
- make certain that cabin pressure forward and aft outflow valves are indicated open.

(2)Test

(a)Test of automatic system controls

ACTION	RESULT
On **CABIN PRESS** panel 432VU 1. Press **SYS1/PUSH TO SEL** pushbutton switch.	On **CABIN PRESS** panel 432VU - On **SYS1/PUSH TO SEL** pushbutton switch, triangle comes on. **SYS1** is selected.
2. Press **SYS2/PUSH TO SEL** pushbutton switch.	- On **SYS1/PUSH TO SEL** pushbutton switch, triangle goes off. - On **SYS2/PUSH TO SEL** pushbutton switch, triangle comes on. **SYS2** is selected.
3. Release **REG2** pushbutton switch.	On **CAPT** and **F/O** main instrument panels **3VU** and **5VU** - **MASTER CAUTION** lights come on. Aural warning : single chime On **L ECAM** display unit, following message is displayed : **CABIN PRESS** - **CAB PRESS REG2 OFF** On **CABIN PRESS** panel 432VU - On **REG2** pushbutton switch, **OFF** legend comes on. - On **SYS2/PUSH TO SEL** pushbutton switch, triangle goes off. - On **SYS1/PUSH TO SEL**, pushbutton switch, triangle comes on. **SYS1** is selected.
4. Release **REG1** pushbutton switch	On **L ECAM** display unit, following message is displayed : **CABIN PRESS** - **CAB PRESS REG1 OFF**

ACTION	RESULT
	- CAB PRESS REG2 OFF - MAN PRESS..... ON PROC : CAB PRESS MAN CTL. On CABIN PRESS panel 432VU - On REG1 pushbutton switch, OFF legend comes on. - On SYS1/PUSH TO SEL pushbutton switch, triangle goes off. - On MAN PRESS pushbutton switch, arrow comes on.
5. Press REG1 pushbutton switch	On L ECAM display unit, following message is displayed : CABIN PRESS : - CAB PRESS REG2 OFF On CABIN PRESS panel 432VU - On REG1 pushbutton switch, OFF legend goes off. - On REG2 pushbutton switch, OFF legend stays on. - On MAN PRESS pushbutton switch, arrow goes off. - On SYS1/PUSH TO SEL pushbutton switch, triangle comes on. - SYS1 is selected.
6. Press REG2 pushbutton switch	On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION warning lights go off. On L ECAM display unit, message disappears. - On REG2 pushbutton switch, OFF legend goes off.

(b)Test of ditching configuration
To close both cabin pressure outflow valves, both refrigeration unit packs, emergency ram air inlet (if open), overboard extract valve, and to lock both safety valves.

Configuration on ground
- both cabin pressure outflow valves are open (visible on CAB PRESS page of R ECAM display unit).
- overboard extract valve is open (on VENT panel 438VU, on OVDB VALVE/INBD annunciator, OVDB flowbar is on).
- emergency ram air inlet is closed.
- on safety valves, visual position indicator is in OPEN position (not locked) (black marking at the end of rack must be level

with black inscription **OPEN** on cover when rack is in up position).

ACTION	RESULT
1. On **COMPT TEMP** panel **437VU** - Press **RAM AIR** pushbutton switch.	On panel **437VU** - On **RAM AIR** pushbutton switch, **ON** legend comes on. - On **RAM AIR** pushbutton switch **OPEN** legend comes on when emergency ram air inlet is open.
2. On **CABIN PRESS** panel **432VU** - release **OUTFLOW FWD** and **AFT** pushbutton switches. **NOTE** : In this case, the outflow valves are controlled in manual mode. Closing of outflow valves in manual mode takes **37 ± 10** seconds.	On **CABIN PRESS** panel **432VU** - On **OUTFLOW FWD** and **AFT** pushbutton switches **OFF** legends come on. - On position indicators, forward and aft outflow valves are indicated closed. On **COMPT TEMP** panel **437VU** - On **RAM AIR** pushbutton switch **OPEN** legend goes off. On **CAB PRESS** page (**R ECAM** display unit). - forward and aft cabin pressure outflow valves are indicated closed. - overboard extract valve is indicated closed. On **AIR BLEED** page (**R ECAM** display unit). - emergency ram air inlet is indicated closed. On **VENT** panel **438VU** - on **OVBD VALVE/INBD** annunciator, **OVBD** flowbar goes off, **INBD** flowbar comes on. On safety valves - visual position indicator is in **CLOSE** position (black marking at the end of rack must be level with black inscription **CLOSE** on cover when rack is in down position).
- press **OUTFLOW FWD** and **AFT** pushbutton switches.	On **CABIN PRESS** panel **432VU** - On **OUTFLOW FWD** and **AFT** pushbutton switches, **OFF** legends go off. - On position indicators, **FWD** and **AFT** valves are indicated open. On **COMPT TEMP** panel **437VU** - On **RAM AIR** pushbutton switch,

ACTION	RESULT
	OPEN legend comes on. On **VENT** panel **438VU** - On **OVBD VALVE/INBD** annunciator, **OVBD** flowbar comes on, **INBD** flowbar goes off. On **CAB PRESS** page (**R ECAM** display unit) - forward and aft cabin pressure outflow valves are indicated open. - overboard extract valve is indicated open. On **AIR BLEED** page (**R ECAM** display unit) - emergency ram air inlet is indicated open. On safety valves - visual position indicator is in **OPEN** position.
3. On **COMPT TEMP** panel **437VU** - release **RAM AIR** pushbutton switch	On **COMPT TEMP** panel **437VU** - On **RAM AIR** pushbutton switch **OPEN** and **ON** legends go off.

(c)Test of outflow valves manual control

NOTE : Opening and closing of outflow valve in manual mode takes 37 ± 10 seconds.

ACTION	RESULT
On **CABIN PRESS** panel **432VU** 1. Press **MAN PRESS** pushbutton switch	On panel **432VU** - On **MAN PRESS** pushbutton switch, arrow and **ON** legend come on. - On **REG1** and **REG2** pushbutton switch, **FAULT** legends come on. On **CAPT** and **F/O** main instrument panels **3VU** and **5VU** - **MASTER CAUTION** lights come on. On **L ECAM** display unit, following message is displayed : **CABIN PRESS** - **CAB PRESS REG 1 FAULT..... OFF** - **CAB PRESS REG 2 FAULT.....OFF** - **PROC : CAB PRESS MAN CTL** Single chime sounds.
2. Place **V/S CTL** switch in **DN** position	**FWD** and **AFT** outflow valves position indicators move to C position.

ACTION	RESULT
3. Place V/S CTL switch in UP position	FWD and AFT outflow valves position indicators move to 0 position.
4. Release MAN PRESS pushbutton switch	- On MAN PRESS pushbutton switch, arrow and ON legend go off. - On REG1 and REG2 pushbutton switch, FAULT legends go off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. On L ECAM display unit, the message disappears.

(d)Test of prepressurization and depressurization electrical sequences

1 On engine 1 and engine 2 low oil pressure switches
- disconnect and cap electrical connectors (Ref. 79-34-11, P. Block 401).

2 Test

ACTION	RESULT
1. Place ENG1 and ENG2 throttle control levers in forward full throttle position.	On CABIN PRESS panel 432VU - FWD and AFT outflow valves position indicators move to C position. On CAB PRESS page (R ECAM display unit) - FWD and AFT outflow valves move to C position.
2. Place ENG1 and ENG2 throttle control levers in forward idle position.	On CABIN PRESS panel 432VU - FWD and AFT outflow valve position indicators move to 0 position. On CAB PRESS page (R ECAM display unit) - FWD and AFT outflow valves move to 0 position.

3 On engine 1 and engine 2 low oil pressure switches
- connect electrical connectors (Ref. 79-34-11, P. Block 401).

(e)Test of cabin pressure outflow valves opening (controlled by emergency ram air inlet)

ACTION	RESULT
1. On LANDING ELEVATION selector 104HM	

ACTION	RESULT
- Select -2000 ft. R NOTE : On the landing elevation R selector 104HM, the following R colors can be seen : R - orange-and-white cross-hatched R area represent "-". R - white-and-black cross-hatched R area represent "0".	
2. On circuit breaker panel 133VU - Open L/G PROX DET/& RELAYS SYS1/RELAYS & RETRACT/CTL circuit breaker 2GB (loc 332/U51) and L/G PROX DET/& RELAYS SYS2/FLT/GND circuit breaker 1GB (loc 331(V52).	On CABIN PRESS panel 432VU - FWD and AFT outflow valves position indicators move to C position.
3. On COMPT TEMP panel 437VU - press RAM AIR pushbutton switch.	On COMPT TEMP panel 437VU - On RAM AIR pushbutton switch, ON legend comes on - On RAM AIR pushbutton switch, OPEN legend comes on when emergency ram air inlet is open. On CABIN PRESS panel 432VU - FWD and AFT outflow valves position indicators move to O position.
- release RAM AIR pushbutton switch.	On COMPT TEMP panel 437VU - On RAM AIR pushbutton switch, OPEN and ON legends go off. On CABIN PRESS panel 432VU - FWD and AFT outflow valves position indicators move to C position.
4. On circuit breaker panel 133VU - close circuit breakers 1GB and 2GB.	On CABIN PRESS panel 432VU - FWD and AFT outflow valves position indicators move to O position.

(f)Test of cabin pressure controller (test OK and BITE test)
- Before carrying out test of automatic systems (on maintenance panel), make certain that each system is in the following configuration
  . no system warnings (FAULT legend off on REG1 and 2 pushbutton switches
  . OFF legends off on OUTFLOW FWD and AFT and REG1 and REG2 pushbutton switches
  . RATE LIMIT selector in NORM position

. 2 engines shut down
. 2 throttle control levers in forward idle throttle position
. main gear shock absorber relays in ground position
. on Captain and F/O altimeters, standard altitude automatic display not selected
. BARO set knob pressed and STD altitude not displayed
. selection of pressure control system to be tested
. cabin differential pressure = 0
. on COMPT TEMP panel 437VU, RAM AIR pushbutton switch released (out), OPEN and ON legends off.

1 Test OK

ACTION	RESULT
On CABIN PRESS section of maintenance panel 471VU - press and hold SYS TEST pushbutton switch.	On CABIN PRESS section of maintenance panel 471VU - OK legend(s) on SYS1(2)/TEST OK annunciator flashes for approx. 28 seconds and remains on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on and MASTER WARN lights flashes. Aural warning : continuous repetitive chime. On L ECAM display unit, the following message is displayed during 3/5 sec : CABIN ALT CABIN PRESS

NOTE : During this test, consider the message title informarion only and ignore the other indications.
During test, the following lights come on :
- FAULT legend on REG1 (2) pushbutton switch
- RATE legend on RATE/LO ΔP annunciator
- LO ΔP on RATE/LO ΔP annunciator.
- The lights will go off after 2/5 seconds

2 BITE test

ACTION	RESULT
In avionics compartment, on shelf 92VU of rack 90VU, on cabin pressure controller - place BITE selector switch in desired position R - press PUSH TO TEST pushbutton switch R and hold till the indicator light remains steady on.	For each of the 10 positions - BITE OK indicator light flashes - BITE OK indicator light should be steady on after Max. 30 seconds.

NOTE : For LAMP & AC PWR and DC PWR positions, the light does not flash and comes on immediately.

NOTE : After test, return BITE selector switch to NORM FLIGHT position.

R (g)Test of cabin pressure control

ACTION	RESULT
On CABIN PRESS panel 432VU	On CABIN PRESS panel 432VU
1. Press SYS1/PUSH TO SEL pushbutton switch.	- On SYS1/PUSH TO SEL pushbutton switch, triangle comes on. SYS1 is selected.
2. Press SYS2/PUSH TO SEL pushbutton switch.	- On SYS1/PUSH TO SEL pushbutton switch, triangle goes off. - On SYS2/PUSH TO SEL pushbutton switch, triangle comes on. SYS2 is selected.
3. Release REG2 pushbutton switch.	On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on. Aural warning : single chime On L ECAM display unit, following message is displayed : CABIN PRESS - CAB PRESS REG2 OFF On CABIN PRESS panel 432VU - On REG2 pushbutton switch, OFF legend comes on. - On SYS2/PUSH TO SEL pushbutton switch, triangle goes off. - On SYS1/PUSH TO SEL, pushbutton switch, triangle comes on. SYS1 is selected.
4. Release REG1 pushbutton switch	On L ECAM display unit, following message is displayed : CABIN PRESS - CAB PRESS REG1 OFF - CAB PRESS REG2 OFF - MAN PRESS..... ON

(3)Close-up

(a)Remove warning notice on FLT COMPT window, CABIN door or MAINTENANCE door previously installed and close access door.

(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(c)Restore system and aircraft to normal operating condition.

R 2. Functional Test

R WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT
R ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE
R ISOLATED.

R CAUTION : TO PREVENT ACCIDENTAL PRESSURIZATION MAKE CERTAIN THAT :
R - AT LEAST ONE FLT COMPT WINDOW OR CABIN DOOR IS OPEN AND REMAINS
R OPEN DURING TEST.
R - IF THE A/C IS PARKED OUTSIDE AND IS NOT PROTECTED FROM THE RAIN,
R ONE MAINTENANCE DOOR SUCH AS 134AR, 136AR, OR AVIONICS ACCESS
R DOOR 121BL IS OPEN AND REMAINS OPEN DURING TEST.

R A. Reason for the Job

R - Test of cabin pressurization.

R B. Equipment and Materials

ITEM	DESIGNATION
(1)	Warning Notices
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 32-00-00, P. Block 501	Landing Gear
- 49-00-00, P. Block 501	Airborne Auxiliary Power or One of the Two HP Ground Air Supply Units Having the Following Characteristics : - pressure between 3.1 and 3.4 bars (45 and 50 psi) - temperature between 180°C and 230°C (335°F and 445°F) - mass flow between 2.02 and 2.2 kg/s (4.2 and 4.8 lb/s).

C. Procedure

(1)Job set-up

(a)Close overhead panel circuit breakers, particularly those associated with CABIN PRESS, VENTILATION, HYDRAULIC (LDG GEAR CTL, LDG GEAR/FLT/GND, AIRBLEED, ECAM).

(b)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(c)Make certain that electronics racks ventilation is correct.

NOTE : Energization of the aircraft electrical network causes the two cabin pressure outflow valves to open.

(d)Put a warning notice on FLT COMPT window, CABIN door or MAINTENANCE door to tell persons that the door must remain open to prevent accidental pressurization.

(e)Make certain that ENG1 and ENG2 throttle control levers are in forward idle throttle position.

(f)On COMPT TEMP panel 437VU

- RAM AIR pushbutton switch is released (out) (OPEN and ON legends are off).
- PACK VALVE 1 and 2 pushbutton switches are released (out) (OFF

legends on).

R (g)On **CABIN PRESS** panel 432VU
- **OUTFLOW/FWD** and **AFT** pushbutton switches are pressed (in) (**OFF** legends are off).
- both outflow valves position indicators are in **O** position.
- **AUTO PRESS/REG** 1 and 2 pushbutton switches are pressed (in) (**OFF** legends are off).
- **MAN PRESS** pushbutton switch is released (out).

R (h)On **ECAM** control panel (center pedestal)
- using **RIGHT DISPLAY** knob, adjust brightness on **R ECAM** display unit.
- press **PRESS** pushbutton switch : pushbutton switch integral light comes on.
- on **R ECAM** display unit, **CAB PRESS** page is displayed.

R (j)On **R ECAM** display unit, on **CAB PRESS** page
- cabin pressure forward and aft outflow valves are indicated open.

(2)Test
(a)Perform **TEST OK** on both systems.
(b)Check for correct operation of pressurization in **MAN** mode.

ACTION	RESULT
On **CABIN PRESS** panel 432VU 1. Press **MAN PRESS** pushbutton switch	On panel 432VU - On **MAN PRESS** pushbutton switch, arrow and **ON** legend come on. - On **REG** 1 and **REG** 2 pushbutton switches, **FAULT** legends come on. On **CAPT** and **F/O** main instrument panels **3VU** and **5VU** - **MASTER CAUTION** lights come on. On **L ECAM** display unit, following message is displayed : **CABIN PRESS** - **CAB PRESS REG 1 FAULT..... OFF** - **CAB PRESS REG 2 FAULT..... OFF** **PROC : CAB PRESS MAN CTL.** - Aural warning : single chime.
2. Place **V/S CTL** switch in **DN** position	On panel 432VU - **FWD** and **AFT** outflow valves position indicator pointers move to **C** position. On **R ECAM** display unit - check that **FWD** and **AFT** outflow valve position corresponds.
3. Place **V/S CTL** switch in **UP** position	On panel 432VU - **FWD** and **AFT** outflow valves position indicator pointers move to **O** position. On **R ECAM** display unit - check that **FWD** and **AFT** outflow

ACTION	RESULT
	valve position corresponds.
4. Release **MAN PRESS** pushbutton switch	On panel 432VU - On **MAN PRESS** pushbutton switch, arrow and **ON** legend go off. - On **REG1** and **REG2** pushbutton switches, **FAULT** legends go off. On **CAPT** and **F/O** main instrument panels 3VU and 5VU - **MASTER CAUTION** lights go off. On **L ECAM** display unit, message disappears.

(c)Check for correct operation of pressurization in automatic mode.

WARNING : PRIOR TO OPENING CIRCUIT BREAKER 119GB TAKE THE APPROPRIATE SAFETY PRECAUTIONS. (REF. 32-00-00, P. BLOCK 501).

ACTION	RESULT
1. On **LANDING ELEVATION** selector 104HM - select -2000 ft.	
R **NOTE** : On the landing elevation selector 104HM, the following colors can be seen : R - orange-and-white cross-hatched area represent "-". R - white-and-black cross-hatched area represent "0".	
2. On circuit breaker panel 133VU - open **L/G PROX DET/& RELAYS SYS1/RELAYS & RETRACT/ CTL** circuit breaker 2GB (loc 332/U51, **SYS1/FLT/GND** circuit breaker 119GB (loc 332/U52), **SYS2/RELAYS & RETRACT/FLT/GND** circuit breaker 1GB (loc 331/V52).	On **CABIN PRESS** panel 432VU - **FWD** and **AFT** outflow valves position indicator pointers move from **O** to **C**.
3. On **LANDING ELEVATION** selector - select +12000 ft.	- **FWD** and **AFT** outflow valves position indicator pointers move from **C** to **O**.
R **NOTE** : On the landing elevation selector 104HM, the following colors can be seen : R - orange-and-white cross-hatched area represent "-". R - white-and-black cross-hatched area represent "0".	

ACTION	RESULT
4. Select second system and check for correct operation of automatic mode as above.	
5. On circuit breaker panel 133VU - close circuit breakers 1GB, 2GB and 119GB.	- no change.

(d)Test of cabin pressurization.

WARNING : PRIOR TO OPENING CIRCUIT BREAKER 119GB TAKE THE APPROPRIATE SAFETY PRECAUTIONS (REF. 32-00-00, P. BLOCK 501).

WARNING : OPENING A PRESSURE SEALED DOOR WHEN THE AIRCRAFT IS FULLY OR PARTLY PRESSURIZED WILL CAUSE AN EXPLOSIVE DECOMPRESSION, DEATH OR INJURY TO PERSONNEL AND DAMAGE TO THE AIRCRAFT.

1 Remove warning notice from FLT COMPT window, CABIN door or MAINTENANCE door.

2 Close all cabin/cargo doors and maintenance doors.

3 Display Warning Notices on inside and outside of all doors, stating : "WARNING : CABIN PRESSURIZED, DO NOT ATTEMPT TO OPEN CABIN/CARGO DOORS".

4 Pressurize pneumatic system.

- using HP ground pneumatic source
  . connect HP ground air supply unit to HP ground connector
  NOTE : To carry out this procedure and to test the right refrigeration unit pack only, open the crossfeed valve as follows :
  On AIR BLEED panel 436VU
  - release X FEED mode pushbutton switch (MAN legend on)
  - press X FEED valve position pushbutton switch (flowbar in line).
- using APU
  . start up APU (Ref. 49-00-00, P. Block 501).
  On AIR BLEED panel 436VU
  - place APU BLEED switch in ON position (flowbar on APU BLEED annunciator comes on)
  - check that X FEED valve position pushbutton switch flowbar is in line.

ACTION	RESULT
1. Place RATE LIMIT selector in NORM position.	
2. On LANDING ELEVATION selector 104HM - select + 12000 ft.	No change.

R NOTE : On the landing elevation
R selector 104HM, the following
R colors can be seen :
R - orange-and-white cross-hatched
R area represent "-".

ACTION	RESULT
R - white-and-black cross-hatched R area represent "0".	
3. On COMPT TEMP panel 437VU - press PACK VALVE 1 and 2 pushbutton switches.	On panel 437VU - OFF legends of PACK VALVE 1 and 2 pushbutton switches go off. - flowbars on PACK VALVE 1 and 2 annunciators are on.
4. On circuit breaker panel 133VU - open L/G PROX DET/& RELAYS SYS1/RELAYS & RETRACT/CTL circuit breaker 2GB (loc 332/U51), SYS1/RELAYS & RETRACT/FLT/GND circuit breaker 119GB (loc 332/U52), SYS2/FLT/GND circuit breaker 1GB (loc 331/V52).	On CAB PRESS page (R ECAM display unit) - overboard extract valve closes.
5. On LANDING ELEVATION selector 104HM - select -2000 ft.	- both (FWD and AFT) outflow valves move towards closed position. - rate of descent is approx. 350 ft./min.
R NOTE : On the landing elevation R selector 104HM, the following R colors can be seen : R - orange-and-white cross-hatched R area represent "-". R - white-and-black cross-hatched R area represent "0".	
6. When rate of change is stabilized - select landing airfield altitude on LANDING ELEVATION selector.	- rate of climb is approx. 500 ft./min.
7. Select second system and perform same test as above.	
8. On circuit breaker panel 133VU - close circuit breakers 1GB, 2GB and 119GB.	On CAB PRESS page - both (FWD and AFT) outflow valves move to open position - overboard extract valve opens.
9. Release PACK VALVE 1 and 2 pushbutton switches	- OFF legends of PACK VALVE 1 and 2 pushbutton switches come on.
10. Depressurize pneumatic system.	
(3)Close-up	

(a)De-energize the aircraft electrical network. (Ref. 24-41-00, P. Block 301).
(b)Restore system and aircraft to normal operating condition.

R CABIN PRESSURE CONTROLLER 105HM (106HM) - REMOVAL/INSTALLATION
R

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking Plugs/Caps
C.	Warning Notice
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 21-31-00, P. Block 501	Cabin Pressure Control and Monitoring

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

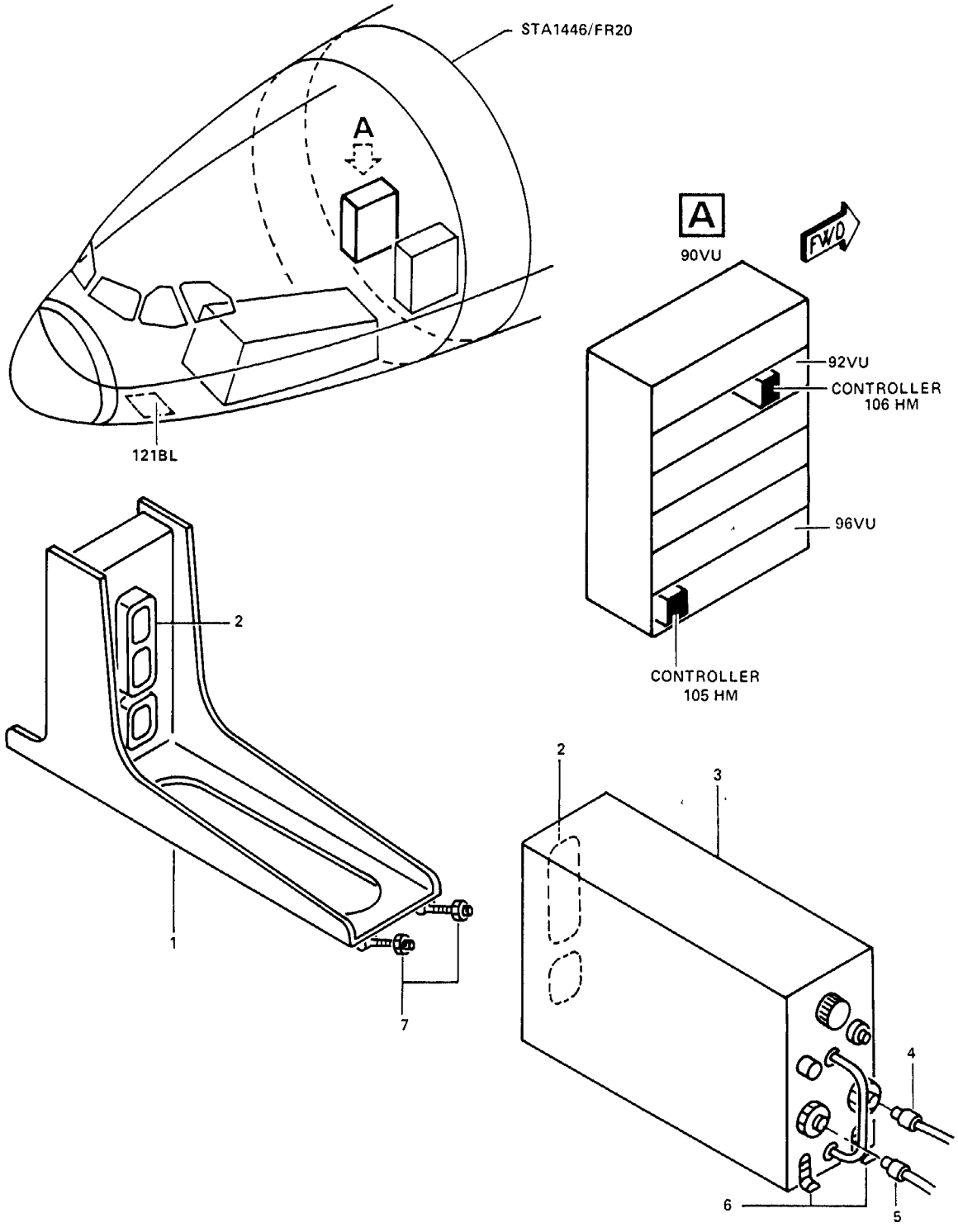
PANEL	SERVICE	IDENT.	LOCATION
22VU	CABIN PRESS/SYS 1/REG	3HM	208/B17
131VU	CABIN PRESS/SYS 1/VALVES MOTOR	1HM	316/C51
131VU	CABIN PRESS/SYS 2/VALVES MOTOR	100HM	316/C52
131VU	CABIN PRESS/SYS 2/REG	4HM	316/C53

(2)Open access door 121BL.
(3)Put a warning notice on this door to tell persons that the door must remain open to prevent accidental pressurization.

B. Removal
(1)Disconnect Quick-Attach-Detach (QAD) connectors (4) and (5) from AMBIENT and STATIC pressure connectors.
NOTE : AMBIENT pressure QAD connector (4) is installed on cabin pressure controller 105HM, shelf 96VU only.
(2)Loosen knurled retaining nuts (7) located forward of mount (1) until studs are released and tilt nuts downwards.
(3)Withdraw cabin pressure controller (3) from mount (1) taking care not to damage electrical connectors (2).
(4)Cap electrical connectors (2).
(5)Remove controller (3).

C. Preparation of Replacement Component
(1)Remove blanking plugs/caps from STATIC and AMBIENT pressure connectors and install on removed component.

D. Installation
(1)Remove blanking plugs/caps and check for correct condition of electrical connectors (2).
(2)Clean and inspect controller interface and/or adjacent area.
(3)Position controller (3) on mount (1) and carefully slide controller until connection is achieved.



Cabin Pressure Controller 105HM (106HM)
Figure 401

(4)Tilt knurled retaining nuts (7) upwards into position on studs (6) and tighten.
(5)Connect QAD connectors (4) and (5) to AMBIENT and STATIC pressure connectors.
NOTE : AMBIENT pressure QAD connector (4) is installed on controller 105HM, shelf 96VU only. AMBIENT pressure line connector is red.
NOTE : After the connection :
- make certain that a colored ring is shown on the QAD connectors
- pull the connectors to make certain that they are connected correctly.
and 100HM.

E. Test
Perform operational test of cabin pressure control and monitoring (test OK) (Ref. 21-31-00, P. Block 501).
R NOTE : Use only test OK for this procedure and not BITE test.

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 121BL.
(3)Remove warning notice.

CABIN PRESSURE CONTROLLER 105 HM/106 HM - DEACTIVATION/REACTIVATION

Ref. : MEL Sect. 1-21, Item 29 (Cabin pressure automatic control systems)

1. Deactivation

A. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

B. Procedure

(1)Initial conditions

(a)Correct electrical power supply.

(2)Open, safety and tag the following circuit breaker :

- if SYS1 is affected :

PANEL	SERVICE	IDENT.	LOCATION
22VU	CABIN PRESS/SYS1/REG	3HM	208/B17

- if SYS2 is affected :

PANEL	SERVICE	IDENT.	LOCATION
131VU	CABIN PRESS/SYS2/REG	4HM	316/C53

(3)Make an entry in the aircraft technical log.

2. Reactivation

(1)Perform trouble shooting (Ref TSM 21-31-00).

Ref. MMEL 21-31-02 (FAA only)

3. Deactivation

A. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure	
- 21-31-00, P. Block 501	Cabin Pressure Control and Monitoring
- 22-10-00, P. Block 501	Autopilot
- 24-41-00, P. Block 301	AC External Power Control

B. Procedure

(1)Initial conditions

(a)Correct electrical power supply.

(2)Open, safety and tag the following circuit breaker :

- if SYS1 is affected :

PANEL	SERVICE	IDENT.	LOCATION
22VU	CABIN PRESS/SYS1/REG	3HM	208/B17

- if SYS2 is affected :

PANEL	SERVICE	IDENT.	LOCATION
131VU	CABIN PRESS/SYS2/REG	4HM	316/C53

(2)Check that the outflow valves manual control operates correctly (Ref. 21-31-00, P. Block 501).

(3)Release REG 1 (REG 2) pushbutton switch (OFF legend comes on).

(4)Perform AP test in CMD mode (Ref. 22-10-00, P. Block 501).

(5)Make an entry in the aircraft technical log.

4. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure	
- 21-31-00, P. Block 501	Cabin Pressure Control and Monitoring
- 22-10-00, P. Block 501	Autopilot
- 24-41-00, P. Block 301	AC External Power Control

B. Procedure

(1)Initial conditions

(a)Correct electrical power supply.

(2)Open, safety and tag the following circuit breaker :

- if SYS1 is affected :

PANEL	SERVICE	IDENT.	LOCATION
22VU	CABIN PRESS/SYS1/REG	3HM	208/B17

- if SYS2 is affected :

PANEL	SERVICE	IDENT.	LOCATION
131VU	CABIN PRESS/SYS2/REG	4HM	316/C53

(3)Perform trouble shooting (Ref. TSM 21-31-00).

CABIN PRESSURE OUTFLOW VALVE - SERVICING

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT THE PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Reason for the Job

Cleaning of valve seat and butterfly of outflow valve.

NOTE : These operations are identical for both forward and aft cabin pressure outflow valves ; only the access doors are different.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notice
B.	Access Platform 2.75 m (9 ft.)
C.	Circuit Breaker Safety Clips
D. Material No. 11-006	Methyl Alcohol (Ref. 20-31-00)
Referenced Procedure - 21-31-12, P. Block 401	Cabin Pressure Outflow Valve

3. Procedure

(Ref. Fig. 301)

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

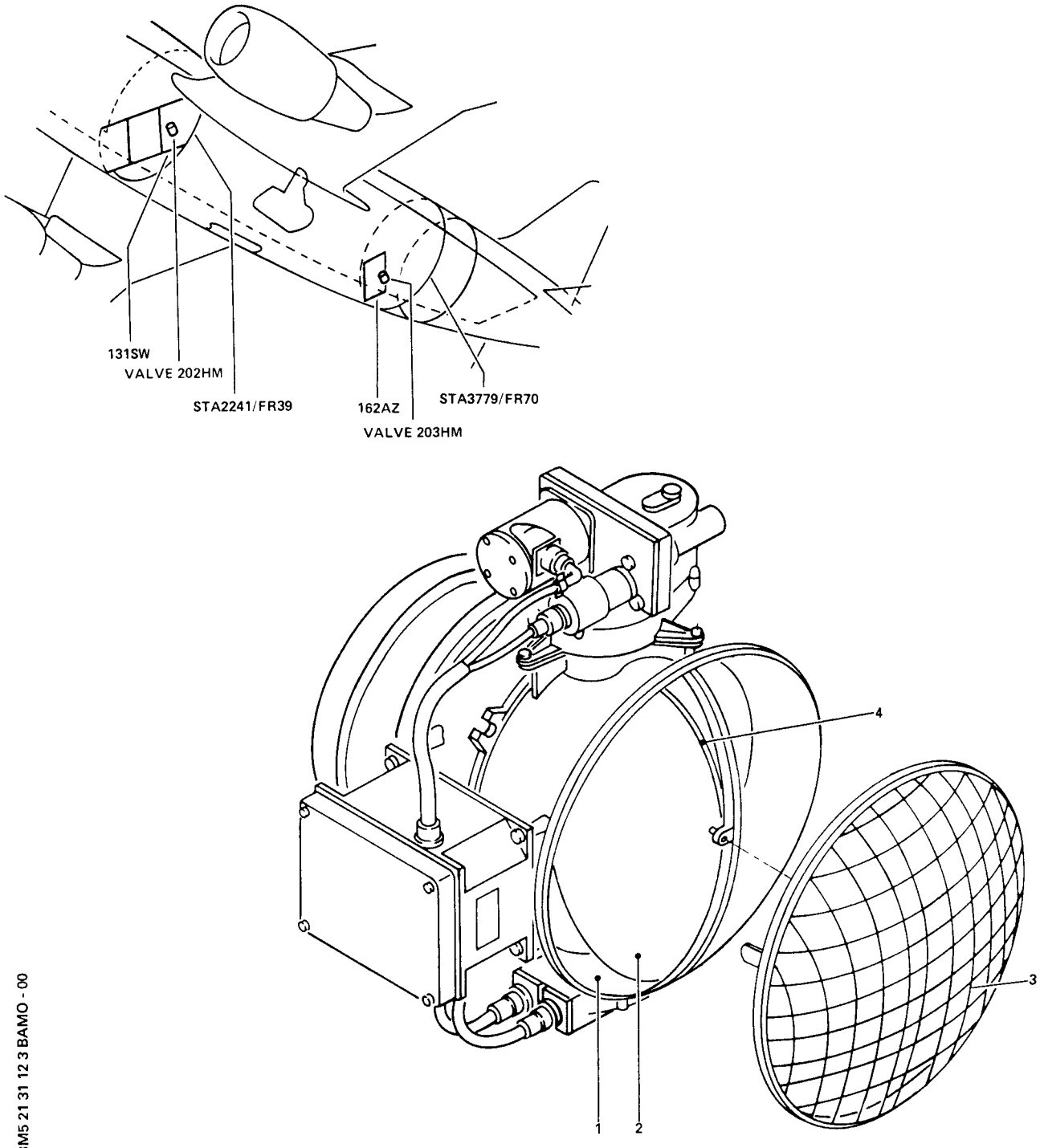
PANEL	SERVICE	IDENT.	LOCATION
22VU	CABIN PRESS/MAN VALVE MOTOR/AFT	127HM	202/H15
22VU	CABIN PRESS/MAN VALVE MOTOR/FWD	124HM	202/H16
22VU	CABIN PRESS/SYS 1/REG.	3HM	208/B17

PANEL	SERVICE	IDENT.	LOCATION
131VU	CABIN PRESS/SYS 1/VALVES MOTOR	1HM	316/C51
131VU	CABIN PRESS/SYS 2/VALVES MOTOR	100HM	316/C52
131VU	CABIN PRESS/SYS 2/REG	4HM	316/C53

R (2)Position access platform.
R (3)Open forward cargo compartment door and access door 131SW for valve 202HM
R (open aft cargo compartment door and access door 162AZ for valve 203HM).
R (4)Put a warning notice on one of these doors to tell persons that the door
R must remain open to prevent accidental pressurization.

R B. Cleaning of Valve Seat and Butterfly

R (1)Remove outflow valve (Ref. 21-31-12, P. Block 401).
R (2)Remove the grille (3).
R (3)Clean valve seat (1) on its periphery with Material No. 11-006.
R (4)Clean butterfly (2) and its seal (4) with Material No. 11-006.
R NOTE : Carry out this operation with great care and when finished, make
R certain that the valve seat, butterfly and seal are flat and not



Cabin Pressure Outflow Valve
Figure 301

R damaged.
R (5)Install the grille (3).
R (6)Install the outflow valve (Ref. 21-31-12, P. Block 401).

R C. Close-Up
R (1)Make certain that the working area is clean and clear of tools and
R miscellaneous items of equipment.
R (2)Close access door 131SW and forward cargo compartment door for valve
R 202HM (close access door 162AZ and aft cargo compartment door for valve
R 203HM).
R (3)Remove safety clips and tags and close circuit breakers 127HM, 124HM,
R 3HM, 4HM, 100HM and 1HM.
R (4)Remove warning notice.
R (5)Remove access platform.

CABIN PRESSURE OUTFLOW VALVE 202HM (203HM) - REMOVAL/INSTALLATION

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

NOTE : The removal/installation procedure is identical for valves 202HM and 203HM.

1. Outflow Valve Control Box

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.75 m (9 ft.)
(2)	Blanking Plugs/Caps
(3)	Circuit Breaker Safety Clips
(4)	Warning Notice
Referenced Procedure - 21-31-00, P. Block 501	Cabin Pressure Control and Monitoring

B. Procedure

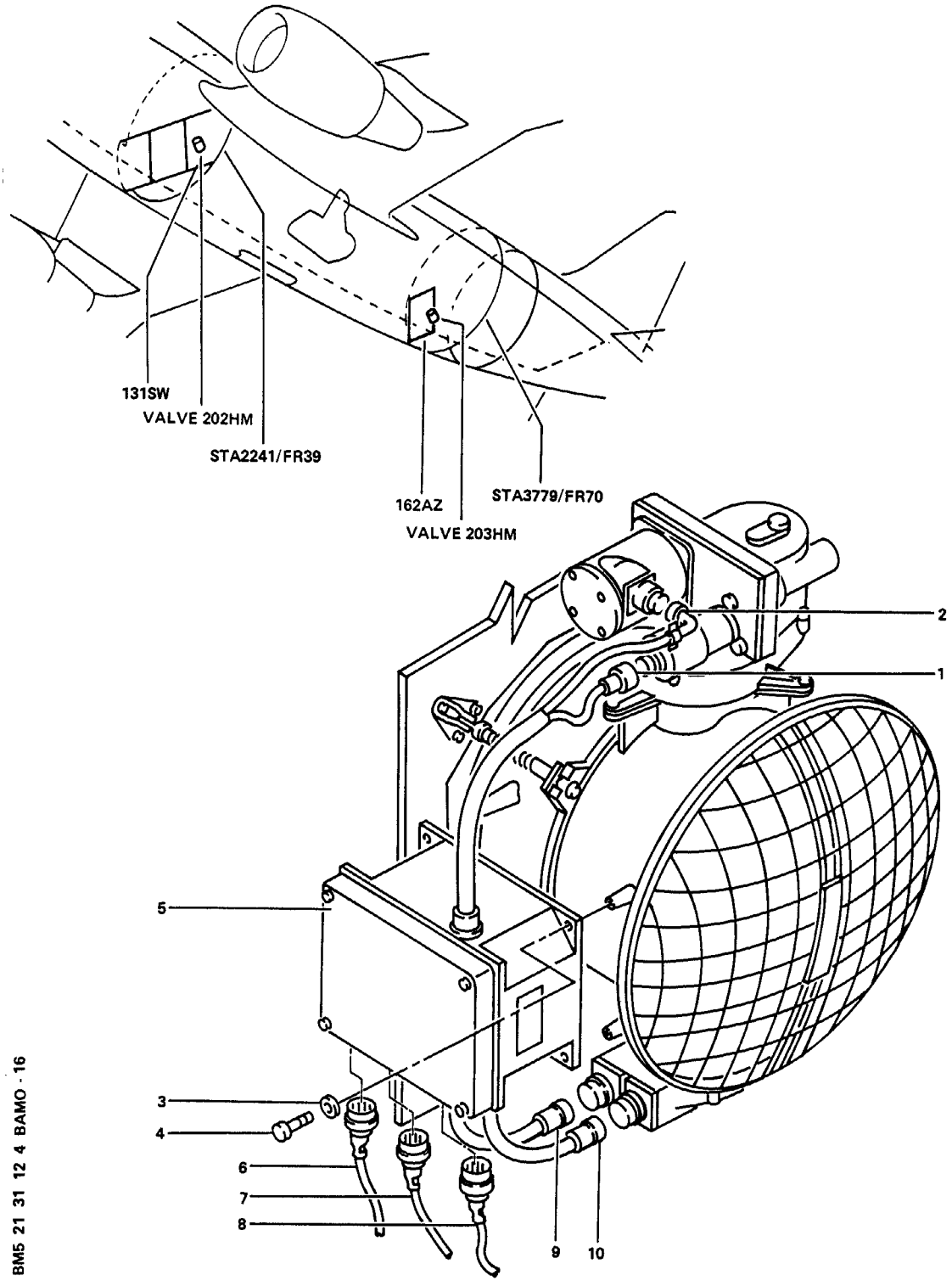
(Ref. Fig. 401)

(1)Job set-up

(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	CABIN PRESS/MAN VALVE MOTOR/AFT	127HM	202/H15
22VU	CABIN PRESS/MAN VALVE MOTOR/FWD	124HM	202/H16
22VU	CABIN PRESS/SYS 1/REG.	3HM	208/B17
131VU	CABIN PRESS/SYS 1/VALVES MOTOR	1HM	316/C51
131VU	CABIN PRESS/SYS 2/VALVES MOTOR	100HM	316/C52
131VU	CABIN PRESS/SYS 2/REG	4HM	316/C53

R (b)Position access platform.
R (c)Open forward cargo compartment door and access door 131SW for valve 202HM (open aft cargo compartment door and access door 162AZ for valve 203HM).
R (d)Put a warning notice on one of these doors to tell persons that the door must remain open to prevent accidental pressurization.
R (2)Removal
R (a)Disconnect connectors (1) and (2) from both control motors.
R (b)Disconnect electrical connectors (9) and (10).
R (c)Disconnect electrical connectors (6), (7) and (8).
R (d)Cap electrical connectors (1), (2), (6), (7), (8), (9) and (10).
R (e)On valve control box (5), cut lockwire and remove screws (4) and washers (3).
R (3)Installation
R (a)Install valve control box (5) and secure with screws (4) and washers (3). Wirelock.
R (b)Remove blanking plugs/caps from valve control box (5) and connectors



Outflow Valve Control Box
Figure 401

R (1), (2), (9) and (10).
R (c)Connect electrical connectors (9) and (10).
R (d)Connect both control motor connectors (1) and (2).
R (e)Remove caps from electrical connectors (6), (7) and (8).
R (f)Connect electrical connectors (6), (7) and (8).
R (g)Remove safety clips and tags and close circuit breakers 1HM, 100HM, 124HM, 126HM and 127HM.
R (4)Test
R (a)Perform operational test of cabin pressure control and monitoring (TEST OK) (Ref. 21-31-00, P. Block 501).
R (b)Check for correct operation of outflow valve in manual (MAN) mode (Ref. 21-31-00, P. Block 501).
R (c)Check for correct operation of pressurization (outflow valve) in automatic (AUTO) mode (Ref. 21-31-00, P. Block 501, Functional Test).
R (5)Close-Up
R (a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R (b)Close forward cargo compartment door and access door 131SW for valve 202HM (close aft cargo compartment door and access door 162AZ for valve 203HM).
R (c)Remove warning notice.
R (d)Remove access platform.

R 2. Outflow Valve Reduction Gearbox/Motor Assembly

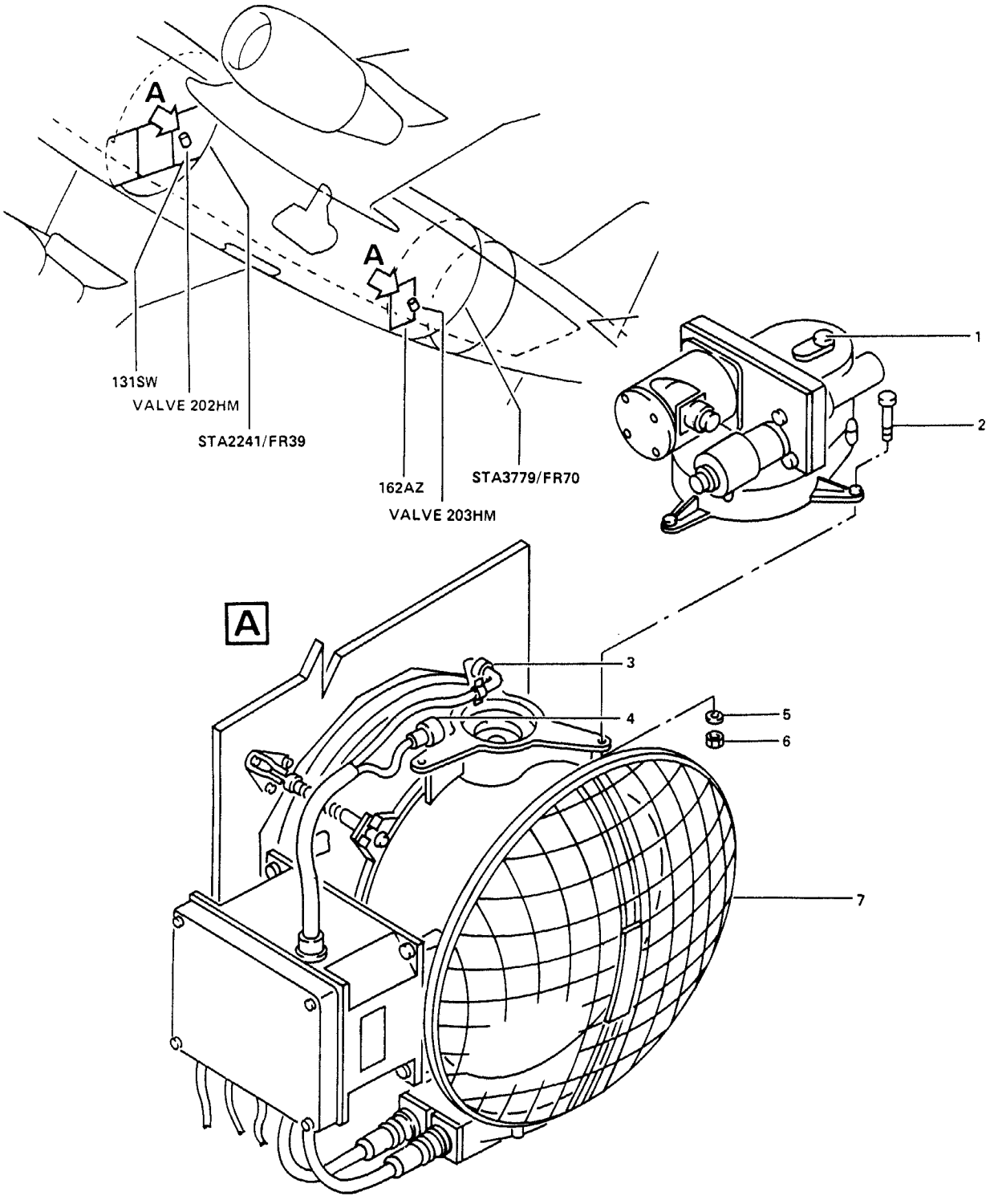
R A. Equipment and Materials

R ITEM	DESIGNATION
R (1)	Access Platform 2.75 m (9 ft.)
R (2)	Blanking Plugs/Caps
R (3)	Circuit Breaker Safety Clips
R (4)	Warning Notice
R Referenced Procedure	
R - 21-31-00, P. Block 501	Cabin Pressure Control and Monitoring

R B. Procedure
(Ref. Fig. 402)
(1)Job set-up
(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	CABIN PRESS/MAN VALVE MOTOR/AFT	127HM	202/H15
22VU	CABIN PRESS/MAN VALVE MOTOR/FWD	124HM	202/H16
22VU	CABIN PRESS/SYS 1/REG.	3HM	208/B17
131VU	CABIN PRESS/SYS 1/VALVES MOTOR	1HM	316/C51
131VU	CABIN PRESS/SYS 2/VALVES MOTOR	100HM	316/C52
131VU	CABIN PRESS/SYS 2/REG	4HM	316/C53

R (b)Position access platform.



Outflow Valve Reduction Gearbox
Figure 402

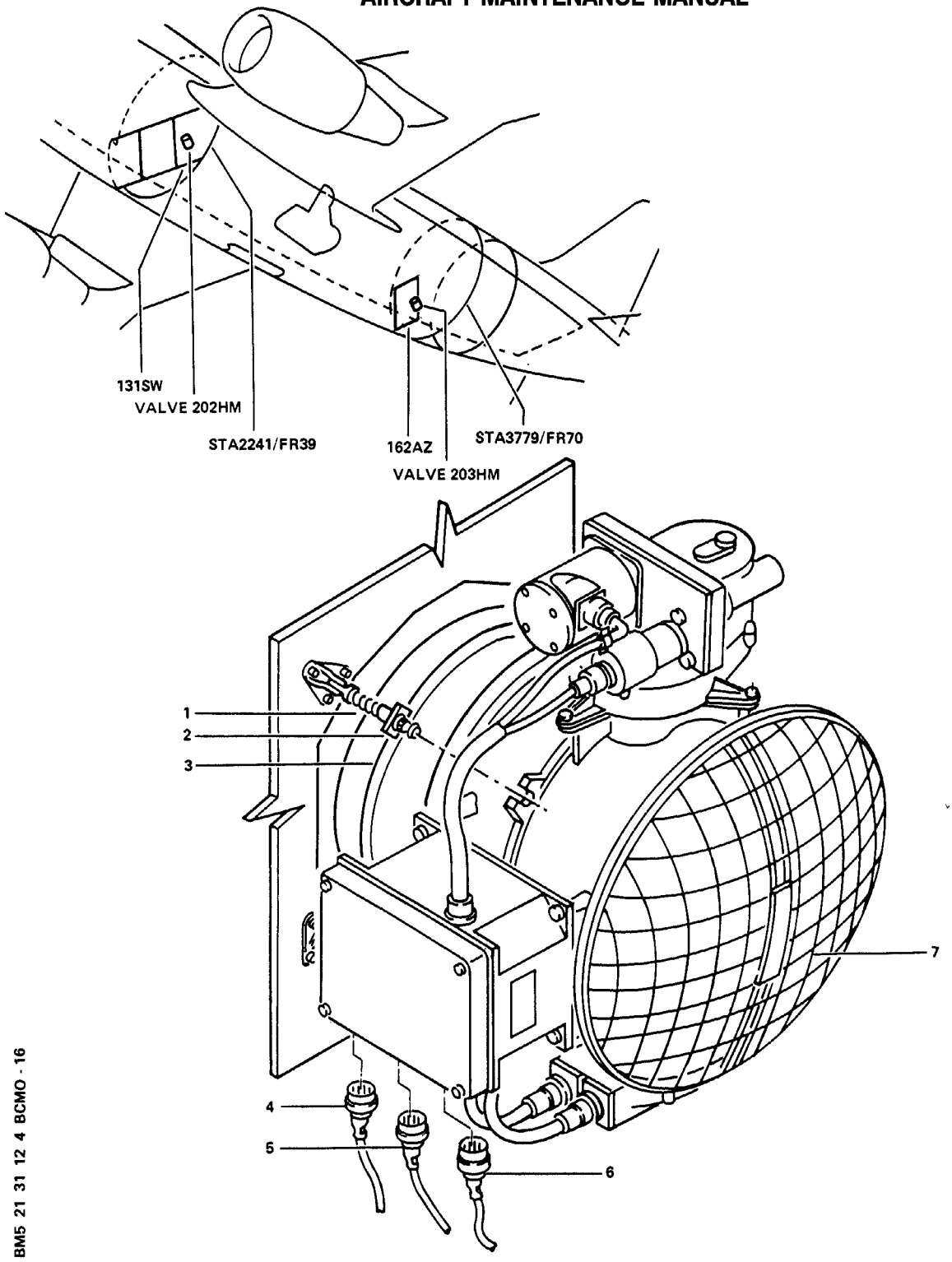
R (c)Open forward cargo compartment door and access door 131SW for valve
R 202HM (open aft cargo compartment door and access door 162AZ for valve
R 203HM).
R (d)Put a warning notice on one of these doors to tell persons that the
R door must remain open to prevent accidental pressurization.
R (2)Removal
R (a)Disconnect and cap electrical connectors (3) and (4) from reduction
R gearbox motor assembly.
R (b)Remove nuts (6), washers (5) and bolts (2).
R (c)Remove reduction gearbox motor assembly (1).
R (3)Installation
R (a)Install reduction gearbox motor assembly (1) on outflow valve (7).
R Install bolts (2), washers (5) and nuts (6).
R (b)Remove caps and connect electrical connectors (3) and (4) on reduction
R gearbox motor assembly (1).
R (c)Remove safety clips and tags and close circuit breakers 127HM, 124HM,
R 3HM, 4HM, 100HM and 1HM.
R (4)Test
R (a)Perform operational test of cabin pressure control and monitoring
R (TEST OK) (Ref. 21-31-00, P. Block 501).
R (b)Check for correct operation of outflow valve in manual (MAN) mode
R (Ref. 21-31-00, P. Block 501).
R (c)Check for correct operation of pressurization (outflow valve) in
R automatic (AUTO) mode (Ref. 21-31-00, P. Block 501, Functional Test).
R (5)Close-up
R (a)Make certain that working area is clean and clear of tools and
R miscellaneous items of equipment.
R (b)Close forward cargo compartment door and access door 131SW for
R valve 202HM (close aft cargo compartment door and access door 162AZ
R for valve 203HM).
R (c)Remove warning notice.
R (d)Remove access platform.

R 3. Cabin Pressure Outflow Valve

R A. Equipment and Materials

R ITEM	DESIGNATION
R (1)	Access Platform 2.75 m (9 ft.)
R (2)	Blanking Plugs/Caps
R (3)	Circuit Breaker Safety Clips
R (4)	O-Ring
R (5)	Warning Notice
R Referenced Procedure	
R - 21-31-00, P. Block 501	Cabin Pressure Control and Monitoring

R B. Procedure
(Ref. Fig. 403)
(1)Job set-up
(a)Open, safety and tag the following circuit breakers :



Cabin Pressure Outflow Valve 202HM(203HM)
Figure 403

PANEL	SERVICE	IDENT.	LOCATION
22VU	CABIN PRESS/MAN VALVE MOTOR/AFT	127HM	202/H15
22VU	CABIN PRESS/MAN VALVE MOTOR/FWD	124HM	202/H16
22VU	CABIN PRESS/SYS 1/REG.	3HM	208/B17
131VU	CABIN PRESS/SYS 1/VALVES MOTOR	1HM	316/C51
131VU	CABIN PRESS/SYS 2/VALVES MOTOR	100HM	316/C52
131VU	CABIN PRESS/SYS 2/REG	4HM	316/C53

R (b)Position access platform.
R (c)Open forward cargo compartment door and access door 131SW for valve 202HM (open aft cargo compartment door and access door 162AZ for valve 203HM).
R (d)Put a warning notice on one of these doors to tell persons that the door must remain open to prevent accidental pressurization.
R (2)Removal
R (a)Disconnect and cap electrical connectors (4), (5) and (6).
R (b)Loosen nuts (2) and disengage eye end forks (1) ; remove valve (7).
R (c)Remove and discard O-ring (3).
R (3)Installation
R (a)Clean and inspect valve adjacent area.
R (b)Install new O-ring (3) in outflow valve (7) groove.
R (c)Install valve ; make certain that O-ring (3) remains in position in groove, install eye ends forks (1) in valve securing lugs. Tighten nuts (2) in diagonal sequence ; TORQUE to 0.5 m.daN (45 lbf.in.) for forward valve 202HM, 0.9 m.daN (80 lbf.in.) for aft valve 203HM.
R (d)Remove blanking caps from electrical connectors and check for correct condition.
R (e)Connect electrical connectors (4), (5) and (6) to valve (7).
R (f)Remove safety clips and tags and close circuit breakers 127HM, 124HM, 3HM, 4HM, 100HM and 1HM.
R (4)Test
R (a)Perform operational test of cabin pressure control and monitoring (TEST OK) (Ref. 21-31-00, P. Block 501).
R (b)Check for correct operation of outflow valve in manual (MAN) mode (Ref. 21-31-00, P. Block 501).
R (c)Check for correct operation of pressurization (outflow valve) in automatic (AUTO) mode (Ref. 21-31-00, P. Block 501, Functional Test).
R (5)Close-up
R (a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R (b)Close access door 131SW and forward cargo compartment door for valve 202HM (close access door 162AZ and aft cargo compartment door for valve 203HM).
R (c)Remove warning notice.
R (d)Remove access platform.

R CABIN PRESSURE AFT OUTFLOW VALVE 203 HM - DEACTIVATION/REACTIVATION
R

Ref. MMEL Sect. 1-21, Item 31 (Cabin pressure outflow valves)

1. Deactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.75 m (9 ft)
(2)	Blanking Plugs/Caps
(3)	Circuit Breaker Safety Clips
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 21-31-12, P. Block 401	Cabin Pressure Outflow Valve
- 25-22-00, P. Block 601	Heat and Sound Insulation

B. Procedure

(Ref. Fig. 901)

CAUTION : THIS PROCEDURE IS ONLY VALID PROVIDED THE VALVE CAN BE SECURED IN FULL CLOSED POSITION.

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that electronics racks ventilation is correct.

(c)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	CABIN PRESS/MAN VALVE MOTOR/AFT	127HM	202/H15
22VU	CABIN PRESS/MAN VALVE MOTOR/FWD	124HM	202/H16
22VU	CABIN PRESS/SYS 1/REG.	3HM	208/B17
131VU	CABIN PRESS/SYS 1/VALVES MOTOR	1HM	316/C51
131VU	CABIN PRESS/SYS 2/VALVES MOTOR	100HM	316/C52
131VU	CABIN PRESS/SYS 2/REG	4HM	316/C53

(d)Position access platform.

(e)Open aft cargo compartment door and access door 162AZ for outflow valve 203HM.

(2)Removal

(a)Remove grille (7).

(b)Make certain that butterfly (8) cannot be moved.

(c)Disconnect and cap electrical connectors (3), (4), (9), (10) and (11).

(d)Remove outflow valve (Ref. 21-31-12, P. Block 401).

(e)Remove bolts (2), washers (6) and nuts (5).

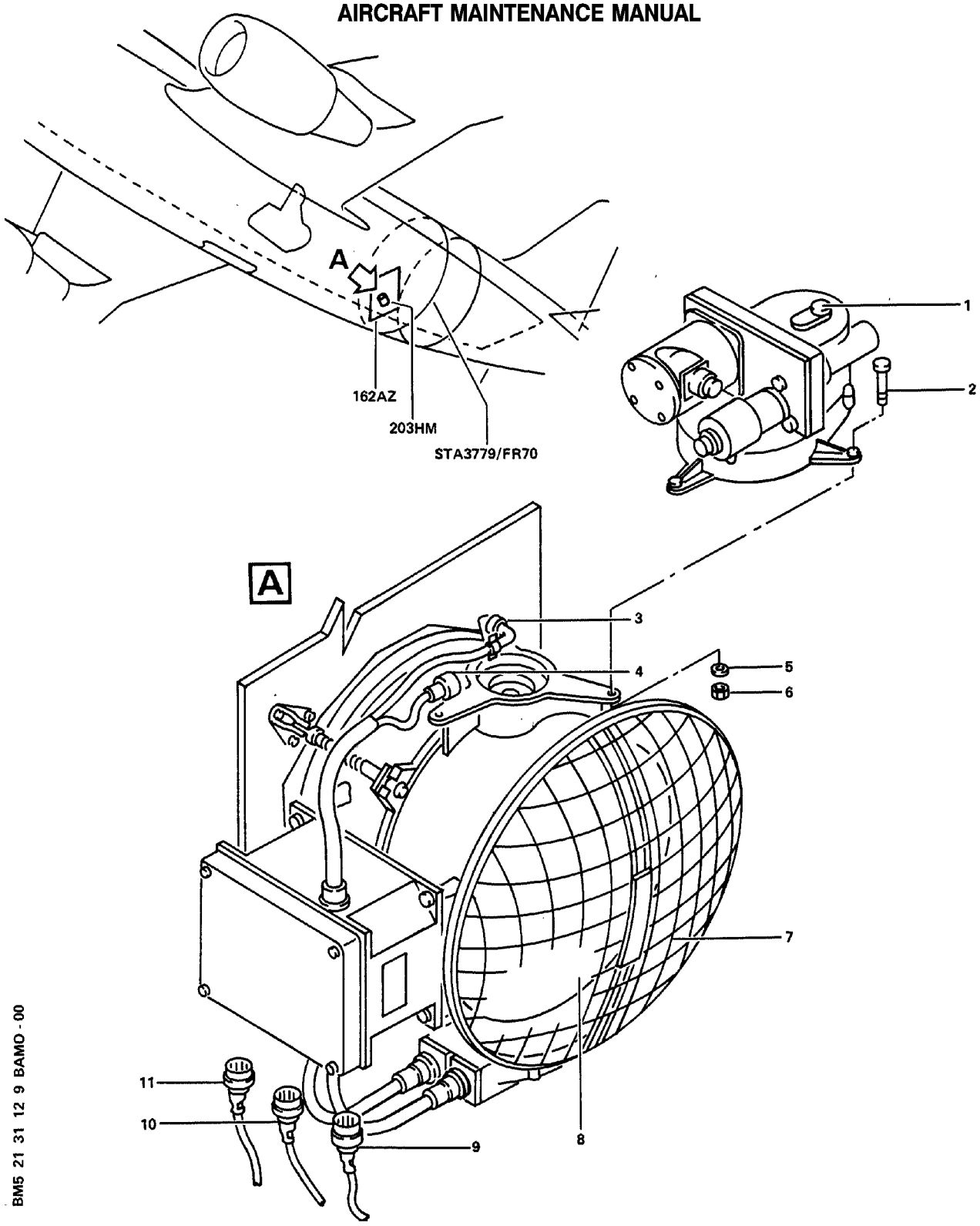
(f)Remove reduction gearbox/motor assy (1).

(g)Close butterfly (8) manually.

(h)Install reduction gearbox/motor assy (1) in a position corresponding to closed butterfly (8).

(i)Check manually that the butterfly (8) cannot be moved.

(j)Install bolts (2), washers (6) and nuts (5).



Cabin Pressure Aft Outflow Valve Deactivation/Reactivation
Figure 901

NOTE : Complete closing of butterfly is impossible. Nevertheless, a gap of a few mm is acceptable (leakage will be compensated by FWD valve).

(k)Install grille (7)

(l)Install outflow valve (Ref. 21-31-12, P. Block 401).

NOTE : Do not connect electrical connectors (3), (4), (9), (10) and (11).

(m)Stow electrical cables and connectors (3), (4), (9), (10) and (11) and secure with tape.

(n)Open forward cargo compartment door and access door 131SW for outflow valve 202HM.

(o)Check that insulation blanket located underneath outflow valve 202HM is correctly positioned and fastened (Ref. 25-22-00, P. Block 601).

(p)Remove safety clips and tags and close circuit breakers 1HM, 3HM, 4HM, 100HM, 124HM and 127HM.

(q)On CABIN PRESS panel 432VU

- release OUTFLOW AFT pushbutton switch (OFF legend comes on).

NOTE : Sometimes FAULT legend on REG 1 (REG 2) pushbutton switch will come on.

(r)Disregard ECAM indications concerning aft outflow valve.

(3)Close-up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Close access doors 162AZ and 131SW.

(c)Remove access platform.

(d)Remove warning notices.

(e)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

R

Ref. MMEL 21-31-04 (FAA only)

2. Deactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.75 m (9 ft)
(2)	Blanking Plugs/Caps
(3)	Circuit Breaker Safety Clips.
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 21-31-12, P. Block 401	Cabin Pressure Outflow Valve

B. Procedure (Ref. Fig. 901)

CAUTION : THIS PROCEDURE IS ONLY VALID PROVIDED THE VALVE CAN BE SECURED IN FULL CLOSED POSITION.

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that electronics racks ventilation is correct.

(c)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	CABIN PRESS/MAN VALVE MOTOR/AFT	127HM	202/H15
22VU	CABIN PRESS/MAN VALVE MOTOR/FWD	124HM	202/H16
22VU	CABIN PRESS/SYS 1/REG.	3HM	208/B17

131VU	CABIN PRESS/SYS 1/VALVES MOTOR	1HM	316/C51
131VU	CABIN PRESS/SYS 2/VALVES MOTOR	100HM	316/C52
131VU	CABIN PRESS/SYS 2/REG	4HM	316/C53

(d)Position access platform.
(e)Open aft cargo compartment door and access door 162AZ for outflow valve 203HM.
(2)Deactivate the outflow valve in open position.
(3)Removal
(a)Remove grille (7).
(b)Make certain that butterfly (8) cannot be moved.
(c)Disconnect and cap electrical connectors (3), (4), (9), (10) and (11).
(d)Remove outflow valve (Ref. 21-31-12, P. Block 401).
(e)Remove bolts (2), washers (6) and nuts (5).
(f)Remove reduction gearbox/motor assy (1).
(g)Open butterfly (8) manually.
(h)Install reduction gearbox/motor assy (1) in a position corresponding to open butterfly (8).
(i)Check manually that the butterfly (8) cannot be moved.
(j)Install bolts (2), washers (6) and nuts (5).
(k)Install grille (7)
(l)Install outflow valve (Ref. 21-31-12, P. Block 401).
NOTE : Do not connect electrical connectors (3), (4), (9), (10) and (11).
(m)Stow electrical cables and connectors (3), (4), (9), (10) and (11) and secure with tape.
(n)Remove safety clips and tags and close circuit breakers 1HM, 3HM, 4HM, 100HM, 124HM and 127HM.
(o)On CABIN PRESS panel 432VU
- release OUTFLOW AFT pushbutton switch (OFF legend comes on).
NOTE : FAULT legend on REG 1 (REG 2) pushbutton switch may come on.
(p)Disregard ECAM indications concerning aft outflow valve.
(4)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Close aft cargo compartment door and access door 162AZ.
(c)Remove access platform.
(d)Make an entry in the aircraft technical log.

Ref. MMEL 21-51-01 (FAA only)

3. Deactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.75 m (9 ft)
(2)	Blanking Plugs/Caps
(3)	Circuit Breaker Safety Clips.
(4)	Tape
(5)	Warning notice

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 21-31-12, P. Block 401	Cabin Pressure Outflow Valve

B. Procedure (Ref. Fig. 901)

CAUTION : THIS PROCEDURE IS ONLY VALID PROVIDED THE VALVE CAN BE SECURED IN FULL OPEN POSITION.

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that electronics racks ventilation is correct.

(c)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	CABIN PRESS/MAN VALVE MOTOR/AFT	127HM	202/H15
22VU	CABIN PRESS/MAN VALVE MOTOR/FWD	124HM	202/H16
22VU	CABIN PRESS/SYS 1/REG.	3HM	208/B17
131VU	CABIN PRESS/SYS 1/VALVES MOTOR	1HM	316/C51
131VU	CABIN PRESS/SYS 2/VALVES MOTOR	100HM	316/C52
131VU	CABIN PRESS/SYS 2/REG	4HM	316/C53

(d)Position access platform.

(e)Open forward (aft) cargo compartment door and access door 131SW (162AZ) for outflow valve 202HM (203HM).

(f)Put a warning notice on one of these doors to tell persons that the door must remain open to prevent accidental pressurization.

(2)Deactivation

(a)Make certain that butterfly (8) is fully open on outflow valve 202HM (203HM).

(b)Disconnect and cap electrical connectors (9), (10) and (11).

(c)Stow electrical cables and connectors (9), (10) and (11) and secure with tape.

(d)Remove safety clips and tags and close circuit breakers 1HM, 3HM, 4HM, 100HM, 124HM and 127HM.

NOTE : FAULT legend on REG 1 (REG 2) pushbutton switch may come on.

(e)Disregard ECAM indications concerning outflow valves.

(3)Close-up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Close access door 131SW (162AZ).

(c)Remove warning notices.

(d)Remove access platform.

(e)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

4. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.75 m (9 ft)
(2)	Circuit Breaker Safety Clips.
(3)	Warning notice
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 21-31-12, P. Block 401	Cabin Pressure Outflow Valve

B. Procedure (Ref. Fig. 901)

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that electronics racks ventilation is correct.

(c)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	CABIN PRESS/MAN VALVE MOTOR/AFT	127HM	202/H15
22VU	CABIN PRESS/MAN VALVE MOTOR/FWD	124HM	202/H16
22VU	CABIN PRESS/SYS 1/REG.	3HM	208/B17
131VU	CABIN PRESS/SYS 1/VALVES MOTOR	1HM	316/C51
131VU	CABIN PRESS/SYS 2/VALVES MOTOR	100HM	316/C52
131VU	CABIN PRESS/SYS 2/REG	4HM	316/C53

(d)Position access platform.

(e)Open forward (aft) cargo compartment door and access door 131SW (162AZ) for outflow valve 202HM (203HM).

(f)Put a warning notice on one of these doors to tell persons that the door must remain open to prevent accidental pressurization.

(2)Reactivation

(a)Remove blanking plug/cap from electrical plug and receptacle.

(b)Connect electrical connectors (9), (10) and (11).

(c)Remove safety clips and tags and close circuit breakers 1HM, 3HM, 4HM, 100HM, 124HM and 127HM.

(d)Troubleshoot the system (Ref. TSM 21-31-00).

(3)Close-up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Close access door 131SW (162AZ).

(c)Remove warning notices.

(d)Remove access platform.

(e)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

R SELECTOR - LANDING ELEVATION (104HM) - REMOVAL/INSTALLATION
R

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking Caps
Referenced Procedure - 21-31-00, P. Block 501	Cabin Pressure Control and Monitoring

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

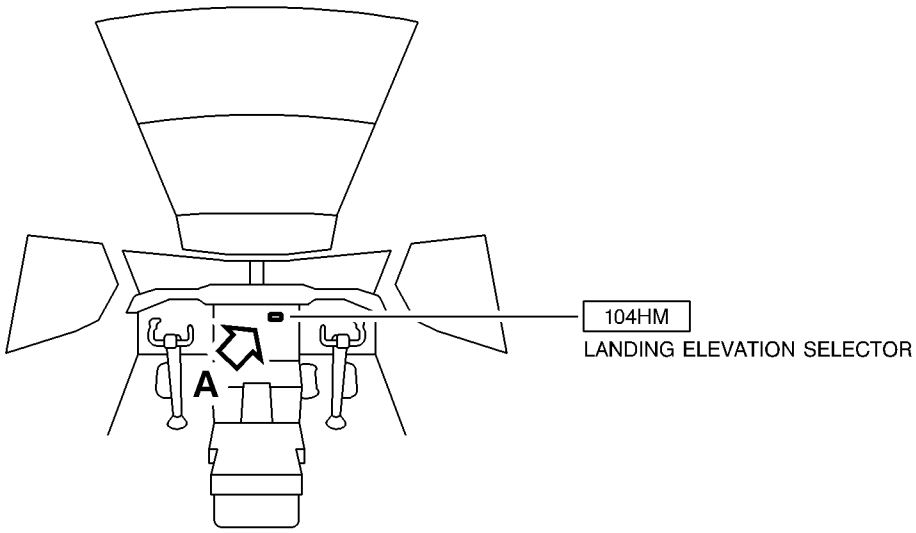
PANEL	SERVICE	IDENT.	LOCATION
22VU	CABIN PRESS/SYS 1/REG	3HM	208/B17
131VU	CABIN PRESS/SYS 1/VALVES MOTOR	1HM	316/C51
131VU	CABIN PRESS/SYS 2/VALVES MOTOR	100HM	316/C52
131VU	CABIN PRESS/SYS 2/REG	4HM	316/C53

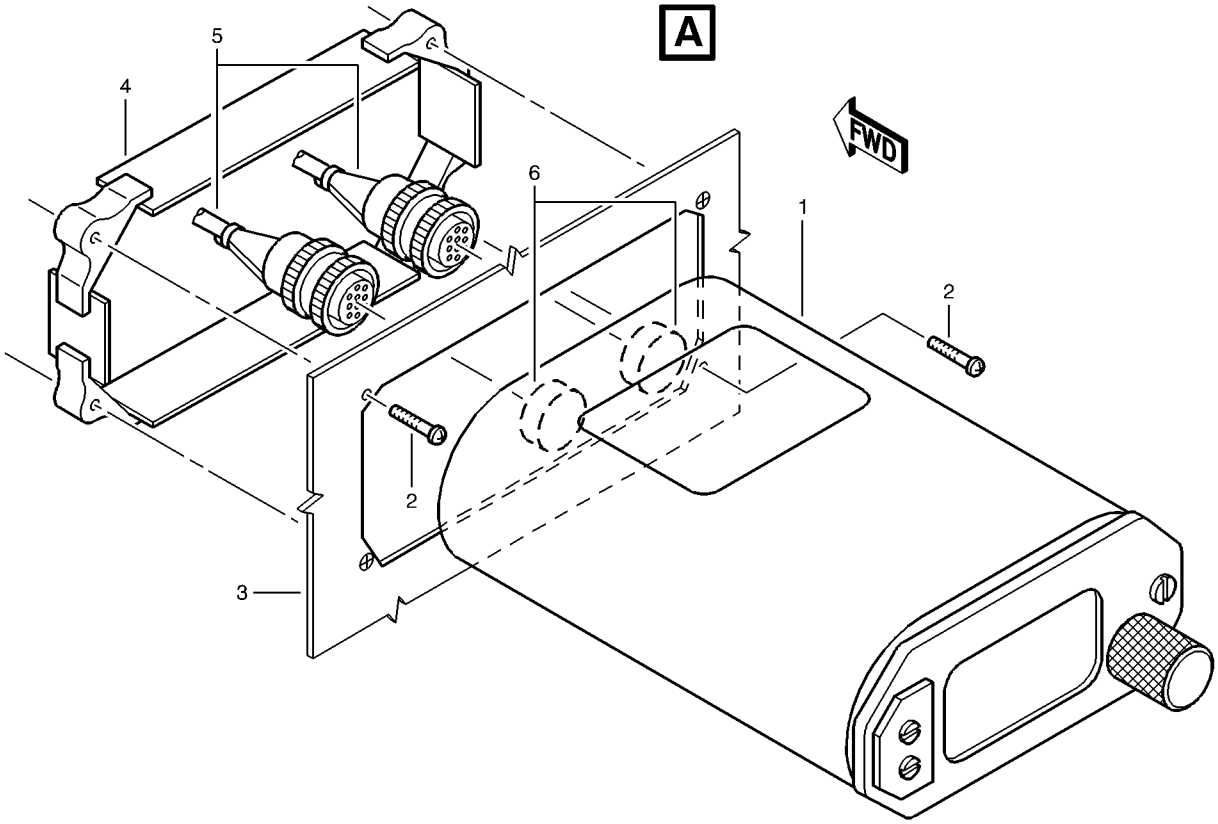
B. Removal
(1)Slacken the two screws (2) on clamp (4).
(2)Pull out selector (1).
(3)Disconnect electrical connectors (5) from receptacles (6).
(4)Cap electrical connectors (5) and receptacles (6).
(5)Remove selector (1).

C. Installation
(1)Clean and inspect selector (1) interface and/or adjacent area.
(2)Remove caps from electrical connectors (5) and receptacles (6) and check for correct condition of electrical connectors.
(3)Connect electrical connectors (5) to receptacles (6).
(4)Position selector (1) in panel (3).
(5)Tighten screws (2).
(6)Remove safety clips and tags and close the following circuit breakers : 3HM, 1HM, 100HM and 4HM.

D. Test
Perform operational test of cabin pressure controller (BITE test) (Ref. 21-31-00, P. Block 501).

E. Close-Up
Make certain that working area is clean and clear of tools and miscellaneous items of equipment.





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Landing Elevation Selector
Figure 401

CABIN PRESSURE SAFETY VALVE 204HM (205HM) - REMOVAL/INSTALLATION

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

NOTE : The removal/installation procedure is identical for safety valves 204HM and 205HM.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.75 m (9 ft)
B.	Circuit Breaker Safety Clips
C.	Blanking Plugs/Caps
D.	O-Ring
E.	Torque Wrench 2 m.daN (177 lbf.in.)
F.	Warning Notice

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	CABIN PRESS/MAN VALVE MOTOR/AFT	127HM	202/H15
22VU	CABIN PRESS/MAN VALVE MOTOR/FWD	124HM	202/H16

(2)Position access platform.

(3)Open access door 136AR.

(4)Put a warning notice on this door to tell persons that the door must remain open to prevent accidental pressurization.

B. Removal

(1)Disconnect electrical connector (2).

(2)Disconnect hose (1) from valve (3).

(3)Remove clamp (4).

(4)Remove safety valve (3) ; remove and discard O-ring (5).

(5)Cap hose (1) open end and electrical connector (2).

C. Installation

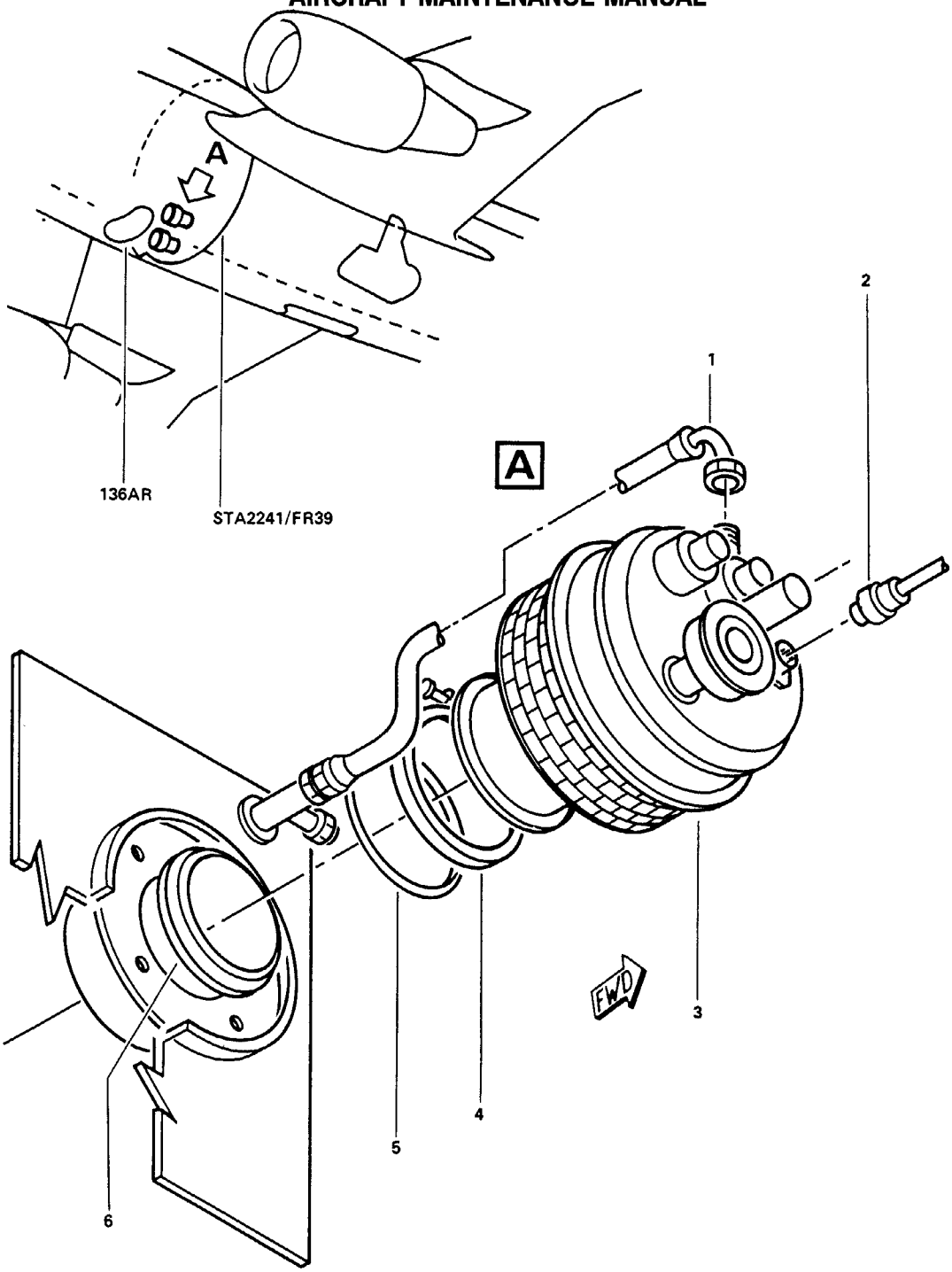
(1)Remove blanking caps and check for correct condition of duct end fittings and electrical connector (2).

R CAUTION : MAKE SURE THAT ALSO THE DUST CAPS FROM THE TWO MANOMETRIC
R CAPSULES ARE REMOVED TO PREVENT MALFUNCTION OF THE SAFETY
R VALVE.

(2)Clean and inspect the valve adjacent area.

(3)Install new O-ring (5) in groove in male flange (6) on aircraft structure side.

(4)Install valve (3) on male flange (6) making certain that O-ring remains



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Cabin Pressure Safety Valve 204HM (205HM)
Figure 401

correctly installed in its groove.
NOTE : A lug on the male flange (6) ensures correct angular positioning of the valve.

(5)Install clamp (4) ; TORQUE nut to the value given on clamp.
(6)Connect hose (1) to valve :
Make certain that 90° union is connected to valve and straight union is connected to pressure port.
TORQUE union nut to 2 m.daN ± 0.1 m.daN (117 lbf.in. ± 9 lbf.in.).
(7)Connect electrical connector (2).
(8)Remove safety clips and tags and close circuit breakers 127HM, 124HM.

D. Test
Perform an operational test of ditching configuration (Ref. 21-31-00, P. Block 501).

E. Close-Up
(1)Make certain that working area is clean and clear of tool and miscellaneous items of equipment.
(2)Close access door 136AR.
(3)Remove warning notice.
(4)Remove access platform.

1. Operational Test

A. Reason for the Test

R To make sure that **CABIN PRESS/SAFETY VALVE/1(2)/OVERPRESS** Memori-
R zed Fault Annunciator **(MFA)** comes on in case of overpressure.

B. Equipment and Materials

ITEM	DESIGNATION
	Access Platform 2.75 m (9 ft.)
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure

NOTE : Test procedure is identical for the two valves.

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that electronics racks ventilation is correct.

(c)Make certain that circuit breakers are closed, particularly those associated with **CABIN PRESS** panel 22VU and **CABIN PRESS** panel 131VU.

(d)On maintenance panel 471VU
- place **ANN LT** switch in **READ** position.

(e)On **ECAM** control panel (center pedestal)
- using **RIGHT DISPLAY** knob, adjust brightness on **R ECAM** display unit.
- press **PRESS** pushbutton switch
- pushbutton switch integral light comes on
- on **R ECAM** display unit, **CAB PRESS** page is displayed.

(f)Position access platform.

(g)Open access door 136AR to gain access to valves.

(h)Unlock the two fasteners and remove valve protective grid.

R (2)Operational test of safety valves opening indication

ACTION	RESULT
1. Manually hold diaphragm in slight open position for at least 35 seconds.	After 30 seconds approx. . On maintenance panel 471VU - **SAFETY VALVE/OVERPRESS MFA** comes on. . On **CAB PRESS** page (**R ECAM** display unit) - safety valves are indicated open (amber).
2. Release diaphragm.	On **CAB PRESS** page - safety valves are indicated closed.
3. On maintenance panel 471VU - press **MFA RESET** pushbutton switch.	On maintenance panel 471VU - **SAFETY VALVE/OVERPRESS MFA** goes off.

(3)Close-up
  (a)Install grid.
  (b)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
  (c)Close access door.
  (d)Remove access platform.
  (e)On maintenance panel 471VU
     - place ANN LT switch in OFF position.
  (f)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

R 2. Functional Test

R A. Reason for the Test
R Removal of the cabin pressure safety valves for functional check in shop.

R B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.75 m (9 ft)
(2)	Circuit Breaker Safety Clips
Referenced Procedure	
- 21-31-15, P. Block 401	Cabin Pressure Safety Valve

R C. Procedure

R D. Job Set-Up
R (1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	CABIN PRESS/MAN VALVE MOTOR/AFT	127HM	202/H15
22VU	CABIN PRESS/MAN VALVE MOTOR/FWD	124HM	202/H16

R (2)Position access platform.
R (3)Open access door 136AR.
R (4)Put a warning notice in position to tell persons that the door must remain open to prevent accidental pressurization.
R (5)Remove cabin pressure safety valve (Ref. 21-31-15, P. Block 401).

R E. Functional Test
R (1)Perform functional test of cabin pressure safety valve in shop.
R (a)Simulate positive delta P>610mb and negative delta P<35mb and make sure that safety valves operate correctly.

R F. Close-Up
R (1)Install cabin pressure safety valve (Ref. 21-31-15, P. Block 401).
R (2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R (3)Close access door 136AR.
R (4)Remove warning notice.
R (5)Remove access platform.

CABIN PRESSURE SAFETY VALVE 204HM (205HM) INSPECTION/CHECK

1. Reason for the Job

A. Visually check that each cabin pressure safety valve position rack indicator is in **OPEN** position

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.75m (9ft.)
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

3. Procedure

A. Job Set-up
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that the electronics racks ventilation is correct.
(3)Make certain that circuit breakers associated with **CABIN PRESS** are closed.
(4)On **CABIN PRESS** panel 432VU.
- make certain that **REG1** and **REG2** pushbutton switches are pressed.
- make certain that **OUTFLOW FWD** and **AFT** pushbutton switches are pressed (**OFF** legends are off).

(5)Position access platform.
(6)Open access door **136AR** to gain access to valves.

B. Inspection/Check
(1)On cabin pressure safety valves **204HM** and **205HM**.
- check that valve rack position indicator is extended (indicator black band facing the **OPEN** mark on transparent cover).

C. Close-Up
(1)Close access door
(2)Remove access platform.
(3)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

CABIN PRESS OUTFLOW VALVE POSITION INDICATOR 200HM (201HM) - REMOVAL/INSTALLATION

NOTE : Removal/Installation procedures for FWD (AFT) cabin pressure outflow valve position indicators 200HM and 201HM are identical.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking Caps
Referenced Procedures	
- 21-31-00, P. Block 501	Cabin Pressure Control and Monitoring
- 24-41-00, P. Block 301	AC External Power Control

2. Procedure

A. Job Set-Up

(1) Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(2) Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	CABIN PRESS/SYS1 REG	3HM	208/B17
22VU	CABIN PRESS/MAN VALVE MOTOR/FWD	124HM	202/H16
22VU	CABIN PRESS/MAN VALVE MOTOR/AFT	127HM	202/H15
131VU	CABIN PRESS/SYS1/VALVES MOTOR	1HM	316/C51
131VU	CABIN PRESS/SYS2/REG	4HM	316/C53
131VU	CABIN PRESS/SYS2/VALVES MOTOR	100HM	316/C52

B. Removal

(Ref. Fig. 401)

(1) On face of panel 432VU, unscrew screw (4) attaching cabin pressure outflow valve position indicator (1). Do not remove screw (4).

(2) Remove cabin pressure outflow valve position indicator (1) from panel 432VU.

(3) Disconnect electrical connector (3) and put blanking caps on electrical connector (3) and associated receptacle (2).

C. Installation

(1) Clean and inspect cabin pressure outflow valve position indicator (1) interface and/or adjacent area.

(2) Remove blanking caps from electrical connector (3) and associated receptacle (2).

(3) Connect electrical connector (3).

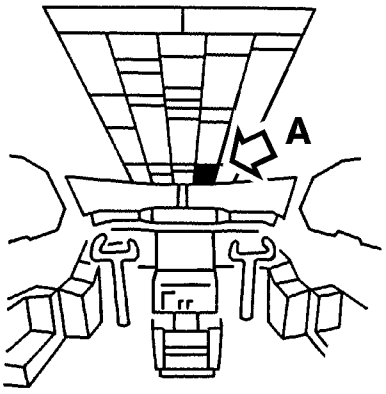
(4) Install cabin pressure outflow valve position indicator (1) on panel 432VU.

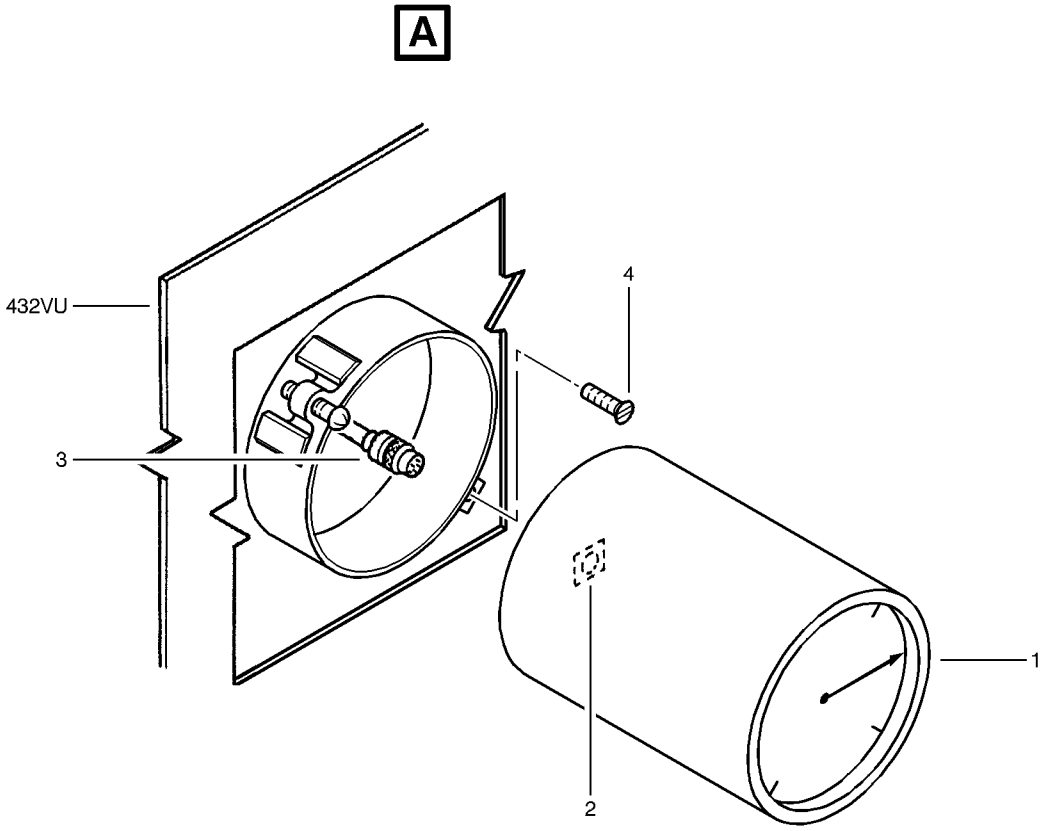
(5) Tighten screw (4).

(6) Remove safety clips and tags and close circuit breakers : 3HM, 124HM, 127HM, 1HM, 4HM, 100HM.

D. Test
(1)Do an operational test of outflow valves manual control (Ref. 21-31-00, P. Block 501).

E. Close-Up
(1)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Restore system and aircraft to normal operating condition.





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Cabin Pressure Outflow Valve Position Indicator
Figure 401

CABIN ALTIMETER 41HM - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking Caps
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 33-13-00, P. Block 501	Instrument and Panel Integral Lighting

2. Procedure

A. Job Set-Up
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
132VU	LIGHTING/INTEGRAL LT/C/B & OVHD & PED	3LF	322/N77

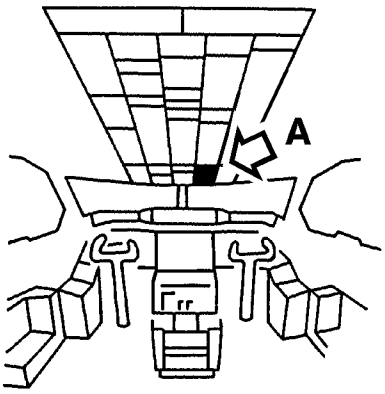
B. Removal
(Ref. Fig. 401)
(1)On face of panel 432VU, unscrew the two screws (3) attaching cabin altimeter (1). Do not remove screws (3).
(2)Remove cabin altimeter (1) from panel 432VU.
(3)Disconnect electrical connector (4) and put blanking caps on electrical connector (4) and associated receptacle (2).

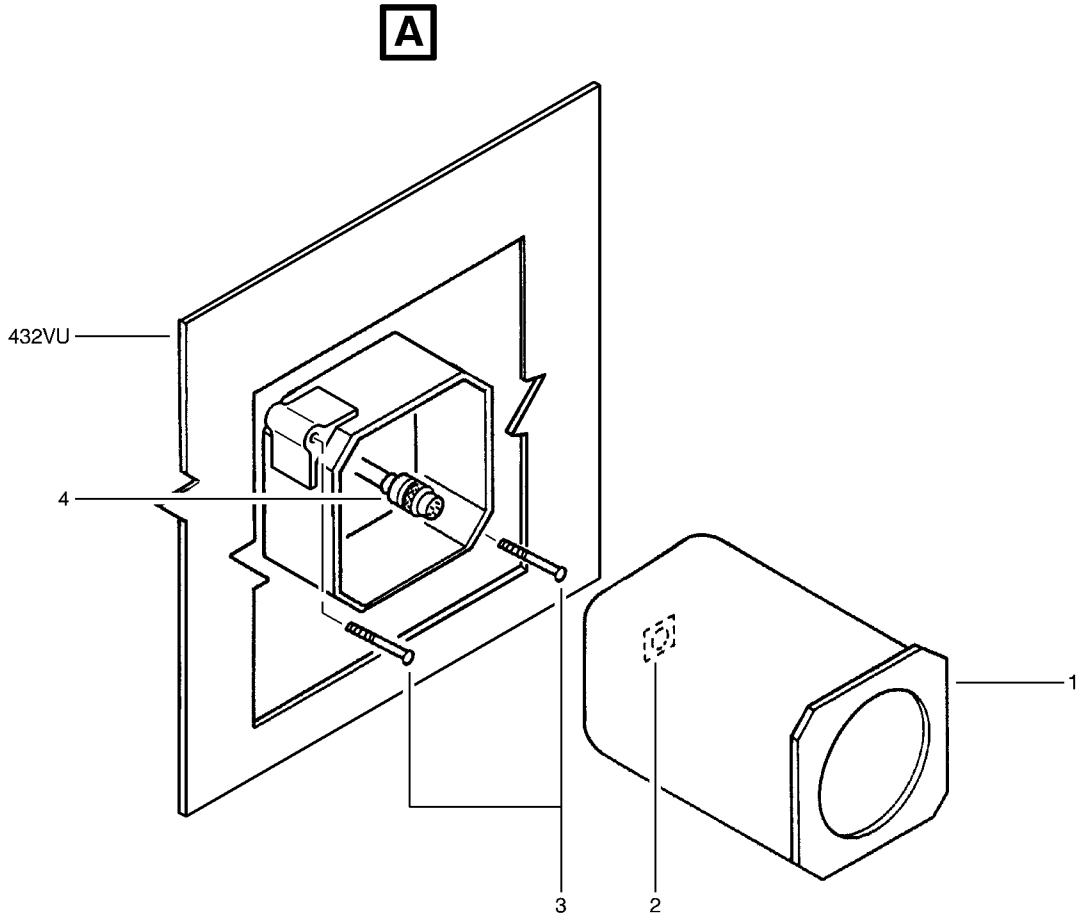
C. Installation
(1)Clean and inspect cabin altimeter, (1) interface and/or adjacent area.
(2)Remove blanking caps from electrical connector (4) and associated receptacle (2). Connect electrical connector (4).
(3)Install cabin altimeter (1) on panel 432VU.
(4)Tighten the two screws (3).
(5)Remove safety clip and tag and close circuit breaker 3LF.

D. Test
(1)Do an integral lighting operational test (Ref. 33-13-00, P. Block 501).

R

E. Close-Up
(1)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Restore system and aircraft to normal operating condition.





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Cabin Altimeter
Figure 401

CABIN VERTICAL SPEED INDICATOR 42HM - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking Caps
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 33-13-00, P. Block 501	Instrument and Panel Integral Lighting

2. Procedure

A. Job Set-Up
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Open, safety and tag the following circuit breaker :

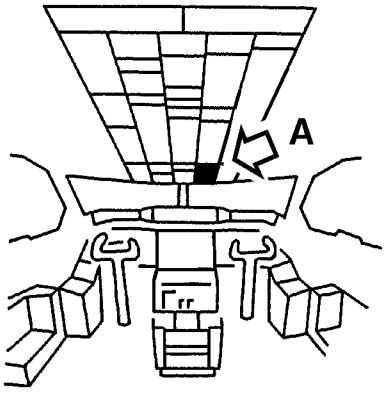
PANEL	SERVICE	IDENT.	LOCATION
132VU	LIGHTING/INTEGRAL LT/C/B & OVHD & PED	3LF	322/N77

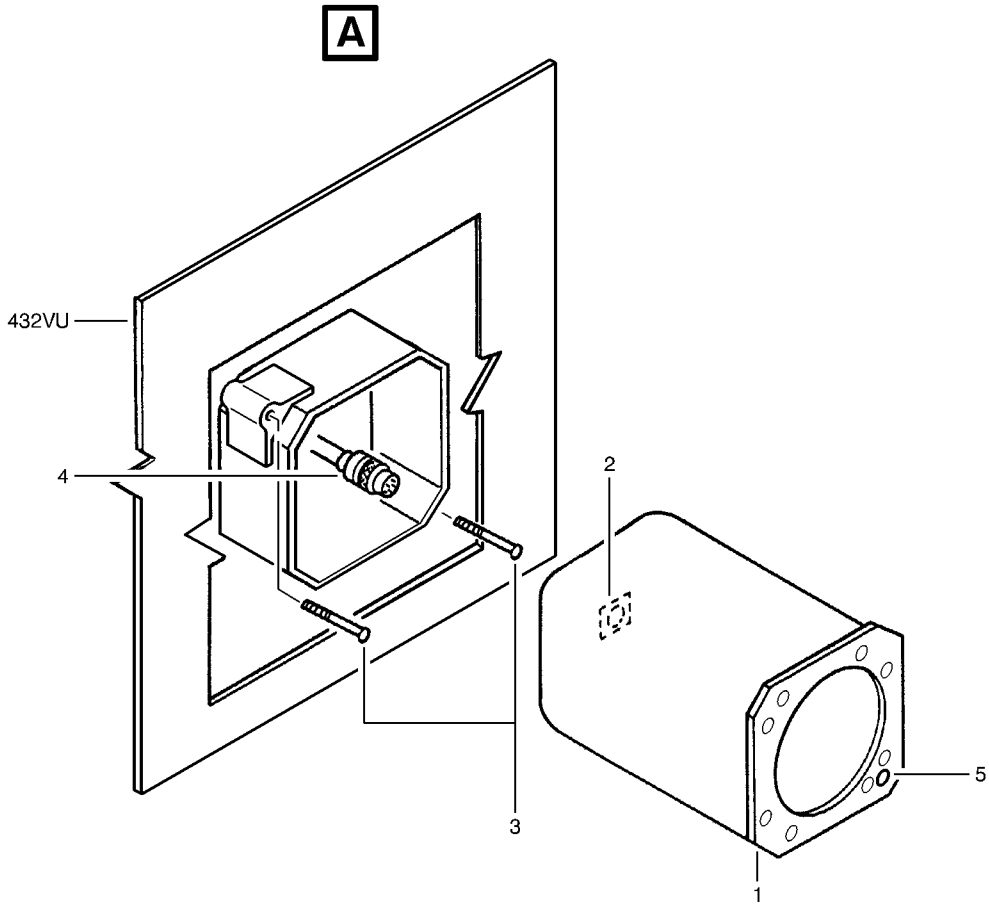
B. Removal
R (Ref. Fig. 401)
(1)On face of panel 432VU, unscrew the two screws (3) attaching cabin vertical speed indicator (1). Do not remove screws (3).
(2)Remove cabin vertical speed indicator (1) from panel 432VU.
(3)Disconnect electrical connector (4) and put blanking caps on electrical connector (4) and associated receptacle (2).

C. Installation
(1)Clean and inspect cabin vertical speed indicator (1) interface and/or adjacent area.
(2)Remove blanking caps from electrical connector (4) and receptacle (2). Connect electrical connector (4).
R (3)Install cabin vertical speed indicator (1) on panel 432VU.
R (4)Tighten the two screws (3).
R (5)Remove safety clip and tag and close circuit breaker 3LF.
R (6)Adjust pointer to zero position with screw (5).

D. Test
(1)Do an integral lighting operational test (Ref. 33-13-00, P. Block 501).

E. Close-Up
(1)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.





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Cabin Vertical Speed Indicator
Figure 401

R

(3)Restore system and aircraft to normal operating condition.

CABIN DIFFERENTIAL PRESSURE INDICATOR 43HM - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking Caps
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 33-13-00, P. Block 501	Instrument and Panel Integral Lighting
- 34-10-00, P. Block 501	Flight Environment Data

2. Procedure

A. Job Set-Up

(1) Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(2) Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
132VU	LIGHTING/INTEGRAL LT/C/B & OVHD & PED	3LF	322/N77

B. Removal

R (Ref. Fig. 401)

R (1) On face of panel 432VU (1), unscrew screws (7) attaching cabin differential pressure indicator (4). Do not remove screws (7).

R (2) Remove cabin differential pressure indicator (4) from panel 432VU (1).

R (3) Disconnect electrical connector (3) and air pressure line Quick-Attach-Detach (QAD) connector (6) from cabin differential pressure indicator (4).

R (4) Put blanking caps on electrical connector (3), air pressure line QAD connector (6) and associated receptacles (5).

C. Installation

R (1) Clean and inspect cabin differential pressure indicator (4) interface and/or adjacent area.

R (2) Remove blanking caps from electrical connector (3), air pressure line QAD connector (6), and associated receptacles (5).

R (3) Connect electrical connector (3) and air pressure line QAD connector (6).

R (4) Make certain that a colored ring is shown on air pressure line QAD connector (6).

R (5) Pull air pressure line QAD connector (6) to make certain that it is connected correctly.

R (6) Install cabin differential pressure indicator (4) on panel 432VU (1).

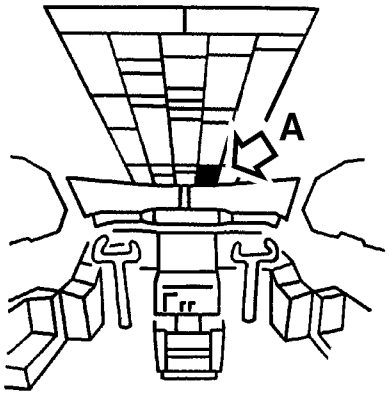
R (7) Tighten the screws (7).

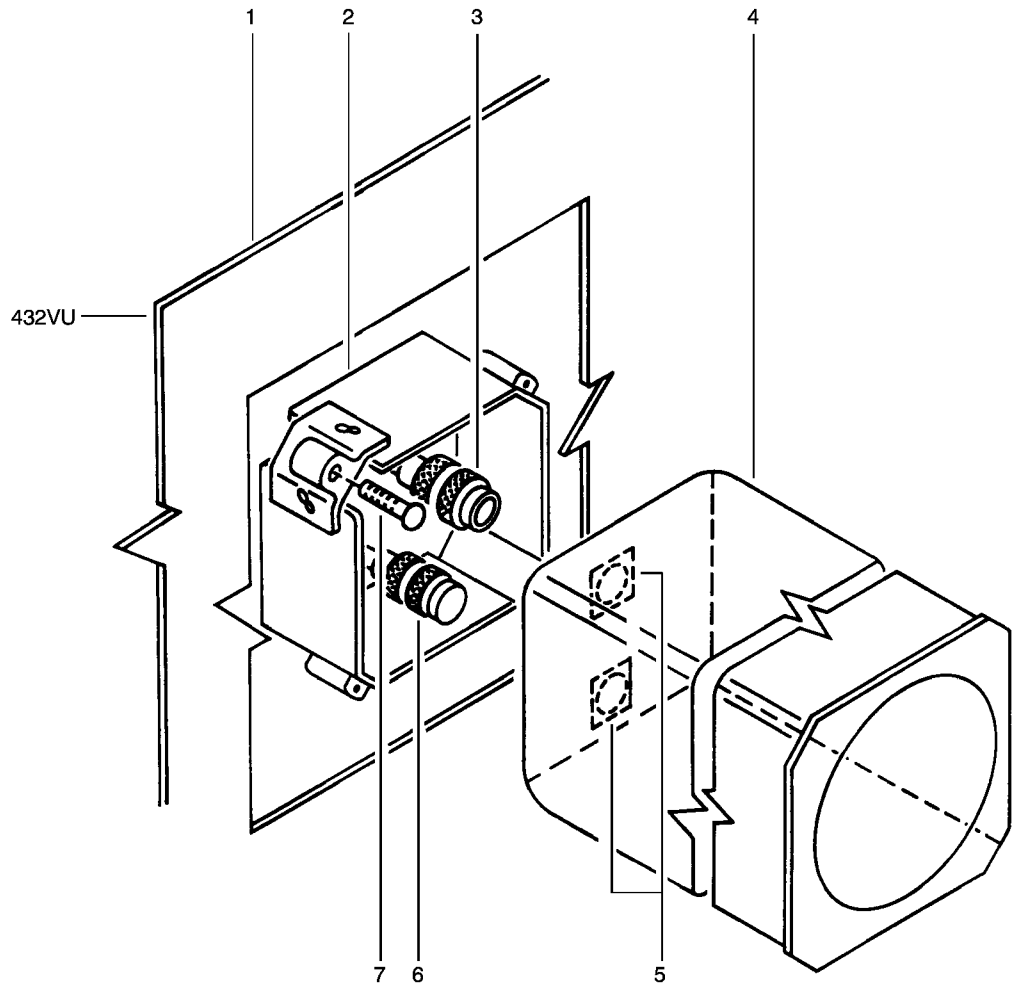
R (8) Remove safety clip and tag and close circuit breaker 3LF.

D. Test

(1) Do an integral lighting operational test (Ref. 33-13-00, P. Block 501).

(2) Carry out leak test of static system (Ref. 34-10-00, P. Block 501





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Cabin Differential Pressure Indicator
Figure 401

R

Para. 3.).

E. Close-Up
(1)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Restore system and aircraft to normal operating condition.

COOLING - DESCRIPTION AND OPERATION

The cooling system provides :
- cooling of air from the pneumatic system by means of refrigeration unit packs in order to supply the pressurized zones of the aircraft with cool and conditioned air (Ref. 21-51-00).
- ventilation of the cabin and electronics racks in the avionics compartment in the event of failure of the air cooling system (Ref. 21-53-00).

The air cooling system consists of two identical refrigeration unit packs, each comprising a refrigeration assembly and a water separation assembly.
In the event of failure of both refrigeration units packs, ventilation is achieved by ram air.
The temperature of air supplying the pressurized zones of the aircraft with conditioned air is regulated by the temperature control system (Ref. 21-60-00).

1. General

The air cooling system processes air from the pneumatic system to provide conditioned air of proper humidity and temperature for distribution to the pressurized compartments.

Air is cooled by two identical refrigeration unit packs, each operating independently from the other.

The amount of airflow supplying the packs is determined by the system requirements ; airflow through each pack is controlled by a flow control valve which also serves to control pack start-up or shutdown (Ref. 21-11-00).

The amount of cooling is determined by the pack temperature control system (Ref. 21-61-00).

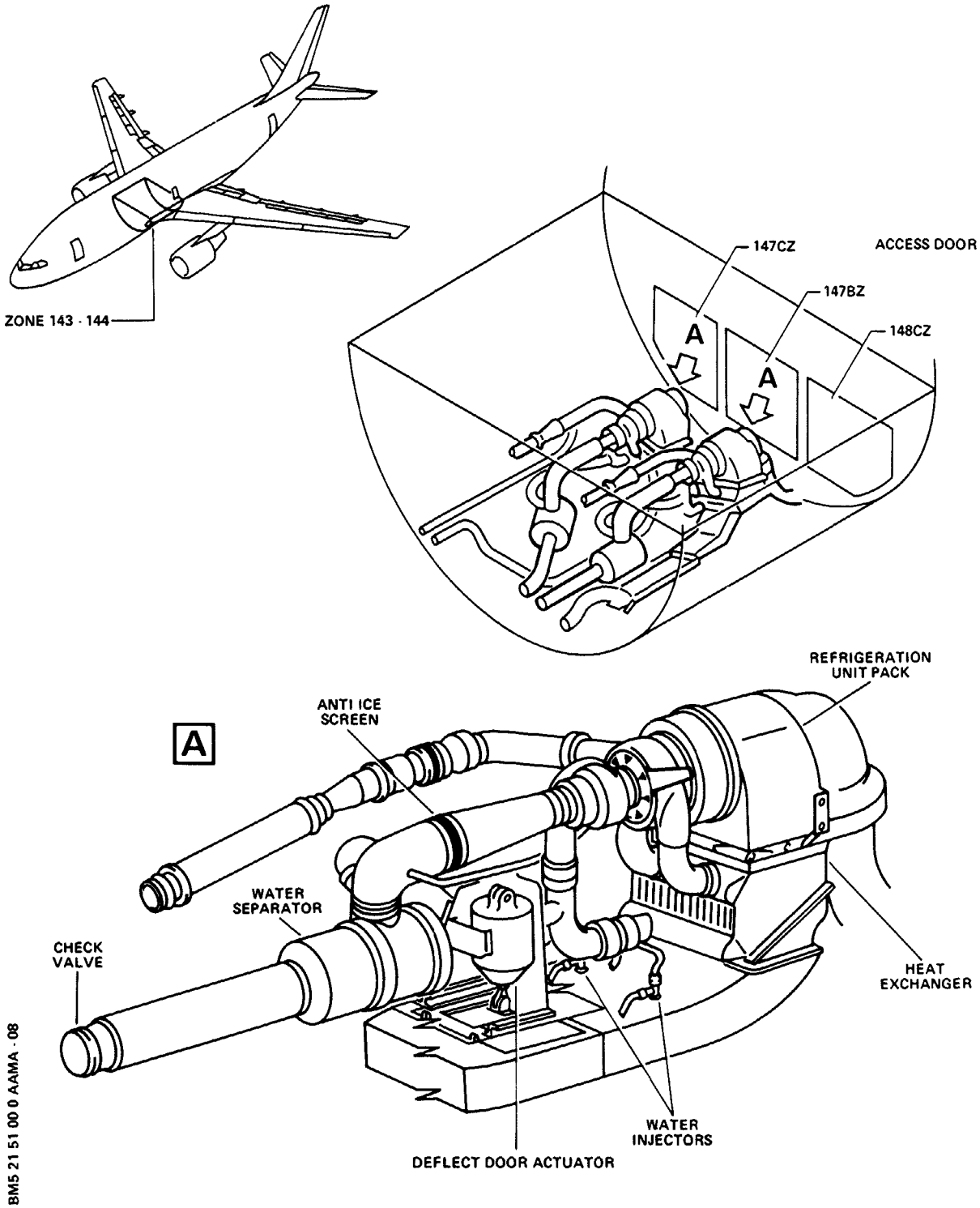
2. Component location

(Ref. Fig. 001)

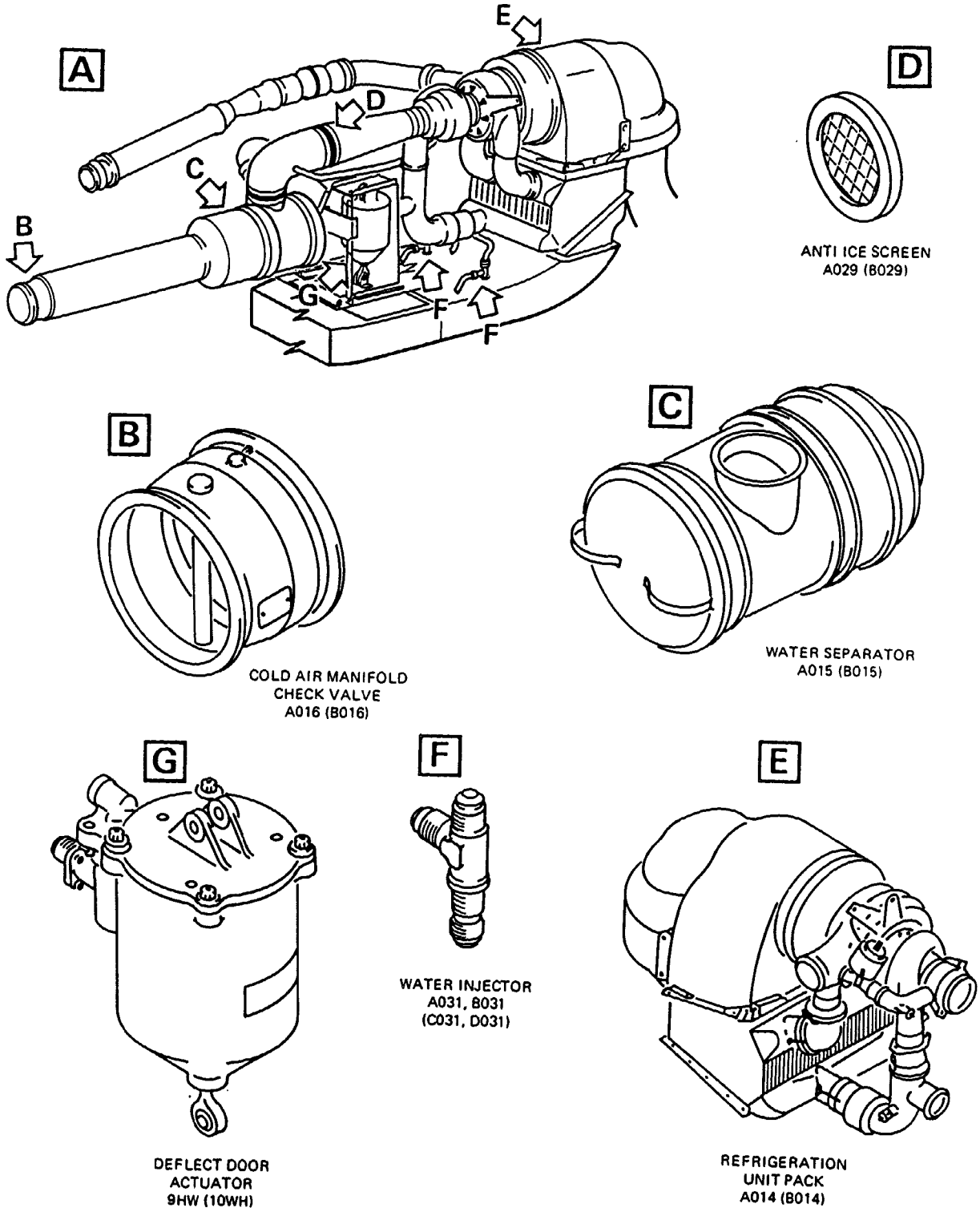
(Ref. Fig. 002)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
A014	PACK-REFRIGERATION UNIT, 1		143	147BZ	21-51-21
B014	PACK-REFRIGERATION UNIT, 2		144	147BZ	21-51-21
A015	SEPARATOR-WATER, PACK 1		143	147BZ	21-51-16
B015	SEPARATOR-WATER, PACK 2		144	147BZ	21-51-16
A016	CHECK VALVE-COLD AIR MANIFOLD, PACK 1		135	131SW	21-51-15
B016	CHECK VALVE-COLD AIR MANIFOLD, PACK 2		135	131RW	21-51-15
A029	SCREEN-ANTI ICE, PACK 1		143	147BZ	21-51-13
B029	SCREEN-ANTI ICE, PACK 2		144	147BZ	21-51-13
A031	INJECTOR-WATER, PACK 1		143	147BZ	21-51-14
B031	INJECTOR-WATER, PACK 1		143	147BZ	21-51-14
C031	INJECTOR-WATER, PACK 2		144	147BZ	21-51-14
D031	INJECTOR-WATER, PACK 2		144	147BZ	21-51-14
9HW	ACTUATOR-DEFLECT DOOR, PACK 1		143	147BZ	21-51-35
10HW	ACTUATOR-DEFLECT DOOR, PACK 2		144	147BZ	21-51-35
	TURBINE-COOLING, PACK 1		143	147BZ	21-51-23
	TURBINE-COOLING, PACK 2		144	147BZ	21-51-23
	VALVE-ANTI ICE, PACK 1		143	147BZ	21-51-24
	VALVE-ANTI ICE, PACK 2		144	147BZ	21-51-24
	CHECK VALVE-COMPRESSOR BYPASS, PACK 1		143	147BZ	21-51-25
	CHECK VALVE-COMPRESSOR BYPASS, PACK 2		144	14BZ	21-51-25
	FUSIBLE PLUG-COMPRESSOR DISCHARGE OVERTEMP, PACK 1		143	147BZ	21-51-26
	FUSIBLE PLUG-COMPRESSOR DISCHARGE OVERTEMP, PACK 2		144	147BZ	21-51-26
	FUSIBLE PLUG-TURBINE INLET OVERTEMP, PACK 1		143	147BZ	21-51-27
	FUSIBLE PLUG-TURBINE INLET OVERTEMP, PACK 2		144	147BZ	21-51-27
	THERMOSTAT-COMPRESSOR		143	147BZ	21-51-28

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
	DISCHARGE PNEUMATIC, PACK 1				
	THERMOSTAT-COMPRESSOR		144	147BZ	21-51-28
	DISCHARGE PNEUMATIC, PACK 2				
	THERMOSTAT-TURBINE		143	147FZ	21-51-29
	INLET PNEUMATIC, PACK 1				
	THERMOSTAT-TURBINE		144	147FZ	21-51-29
	INLET PNEUMATIC, PACK 2				
	CHECK VALVE-FAN BYPASS, PACK 1		143	147FZ	21-51-31
	CHECK VALVE-FAN BYPASS, PACK 2		144	147FZ	21-51-31
	EXCHANGER-HEAT, PACK 1		143	147FZ	21-51-32
	EXCHANGER-HEAT, PACK 2		144	147FZ	21-51-32



Air Cooling System-Sheet 1/2
Figure 001



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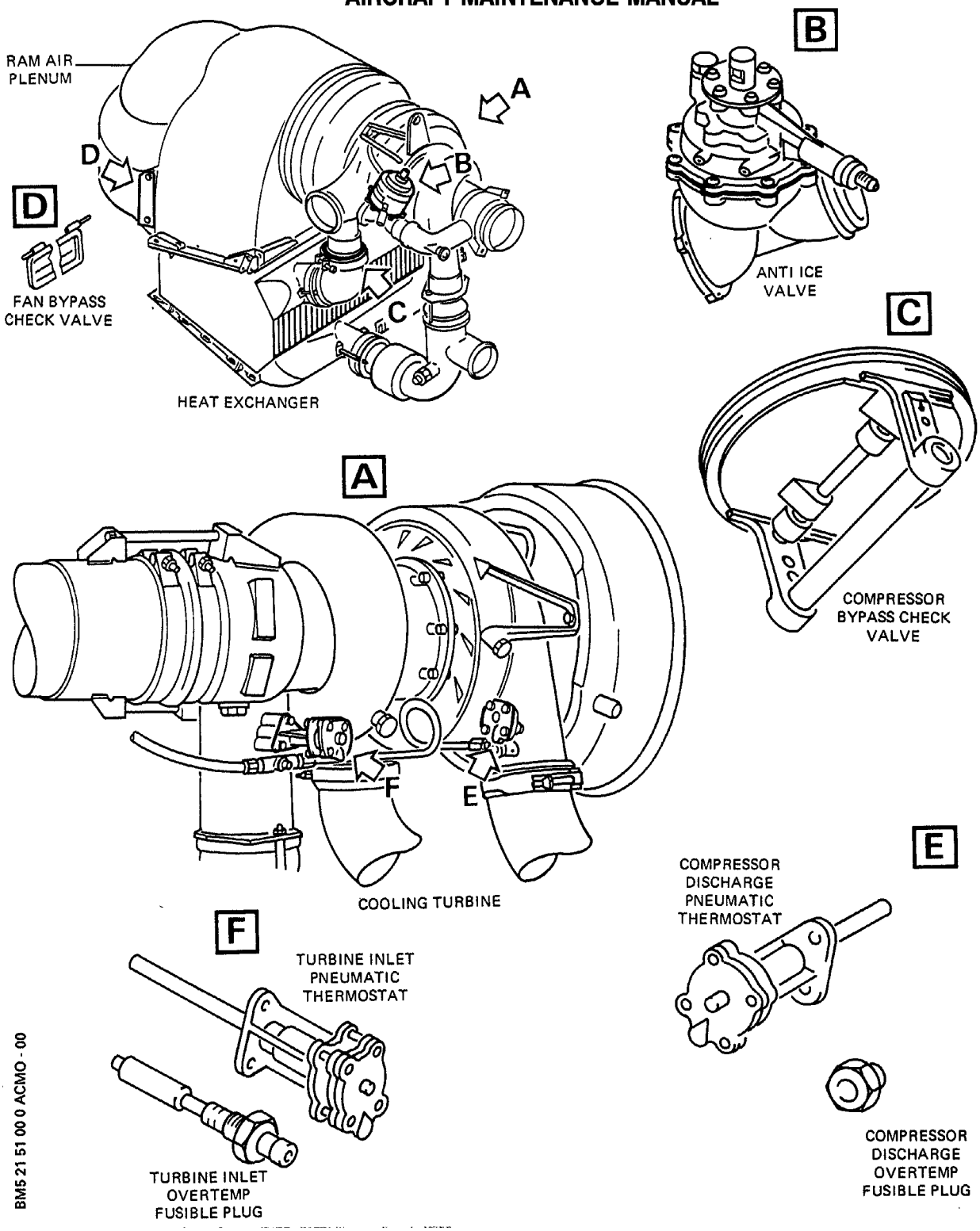
Air Cooling System-Sheet 2/2
Figure 001



Refrigeration Unit Pack
Figure 002

3. Description (Ref. Fig. 001)

The air cooling system mainly consists of two refrigeration unit packs, each comprising :

- a refrigeration assembly provided for refrigerating hot air from the pneumatic system
- a water separation assembly.

Refrigeration of air in each pack is accomplished by :

- an air cycle machine including a cooling turbine assembly with compressor, turbine and fan mounted on a common shaft ; an anti ice valve ; a compressor bypass check valve ; two thermostats ; two fusible plugs
- an air-to-air heat exchanger
- a ram air system comprising a ram air inlet and a fan circulating air in the heat exchanger.

A deflect door is installed in each pack cooling air inlet to blank off the external cooling air inlet during the landing and takeoff phases to avoid ingestion of foreign bodies by the heat exchanger. During these flight phases, the cooling air is bled from the air conditioning compartment through an aperture left open by the deflect door.

The water separation system removes moisture from the turbine discharge air and injects the moisture into the ram airstream upstream of the heat exchanger. The system consists of a water separator, water injectors and an anti ice screen.

4. Component Description

A. Refrigeration Unit Pack (Ref. Fig. 002, 003)

The refrigeration unit packs provide the capability for refrigerating air bled from the pneumatic system to supply conditioned air to the occupied compartments. The pack comprises :

- an air cycle machine
- a heat exchanger
- a ram air plenum with a fan bypass check valve.

(1) Air cycle machine

(a) Description

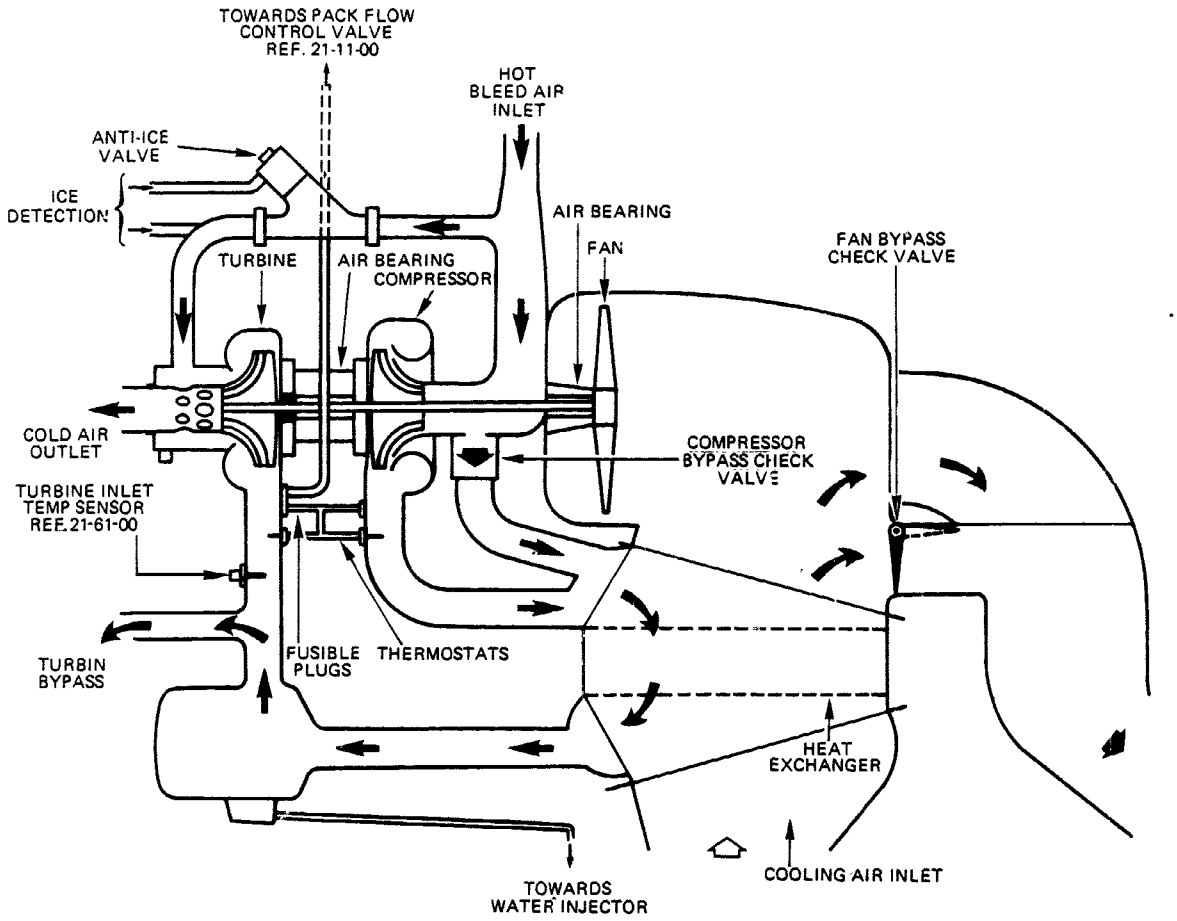
The air cycle machine comprises :

- a cooling turbine assembly including a compressor, a turbine and a fan
- an anti ice valve and associated system provided to bypass the cooling turbine assembly
- a compressor bypass check valve
- a fusible plug and a thermostat at the compressor outlet
- a fusible plug and a thermostat at the turbine inlet.

(b) Operation

(Ref. Fig. 003)

Hot air enters the compressor where it is compressed to a higher temperature and pressure. The high compressor outlet pressure causes the check valve in the compressor bypass duct to close and prevent recirculation of air. When less cooling is required, the compressor rotation is slowed ; the compressor outlet pressure is reduced and when it is lower than the compressor inlet pressure, the compressor bypass check valve opens to bypass air around the compressor. A compressor



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Refrigeration Unit Pack - Schematic
Figure 003

discharge pneumatic thermostat and compressor discharge overtemperature fusible plug located in the compressor outlet duct prevent the pack from overheating. Compressed air, partially cooled by the heat exchanger, expands in the turbine, giving up more heat in the form of energy to drive the compressor and fan. The energy removed from the turbine airflow causes a further temperature reduction. Cooling of the air in the turbine may be such that turbine outlet temperature drops below freezing point ; the anti ice valve and associated system prevents the system from icing up.

A turbine inlet pneumatic thermostat and turbine inlet overtemperature fusible plug located in the turbine inlet duct prevent the pack from overheating.

The cooling fan portion of the air cycle machine circulates the air through the heat exchanger.

(2)Cooling turbine (Ref. Fig. 003)

The cooling turbine is a rotating assembly including a turbine, compressor and fan mounted on a common shaft. The shaft is supported by two air bearings. The cooling turbine provides cool air for aircraft air conditioning system ; when ram air is not available (in flight at low speed or on the ground), the cooling turbine circulates air through the heat exchanger.

(3)Compressor bypass check valve

The check valve enables air to bypass the compressor thus reducing the drag load on the shaft during periods when the compressor rotates at low speed with the inlet pressure higher than the outlet pressure. The check valve is of the two semi circular flap type.

(4)Anti ice valve

(Ref. Fig. 004)

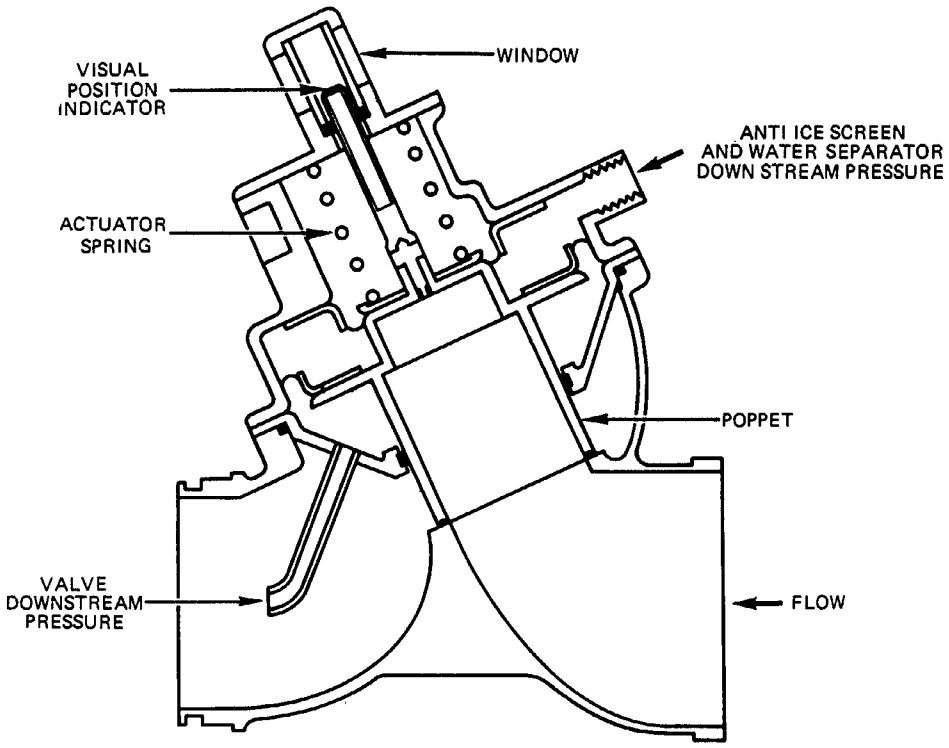
The anti ice valve modulates the hot air flow at the turbine outlet to prevent the water separator and the turbine outlet from icing up and to maintain temperature around dew point. The valve is equipped with a visual position indicator. It is pneumatically actuated and spring-loaded closed.

In the event of ice formation on the anti ice screen at the turbine outlet, the differential pressure across the anti ice screen and the water separator causes the valve to open.

(5)Compressor discharge and turbine inlet pneumatic thermostats

(Ref. Fig. 005)

The compressor discharge and turbine inlet pneumatic thermostats are differential pressure thermostats which supply overheat protection for the air cycle machine. The compressor discharge thermostat is located in the compressor discharge duct adjacent to the fusible plug and the turbine inlet thermostat is located in the turbine inlet duct adjacent to the fusible plug. A pressure sense line from the pack flow control valve is connected to the thermostats. Both pneumatic thermostats are physically identical except for the position of the triangularly-shaped mounting flange. The difference in mounting hole position ensures installation of thermostat into the correct duct. The temperature sensing elements consist of two metals with different coefficients of expansion. If the duct air approaches the actuation temperature, the temperature sensing elements begin to respond and with increasing temperature, a



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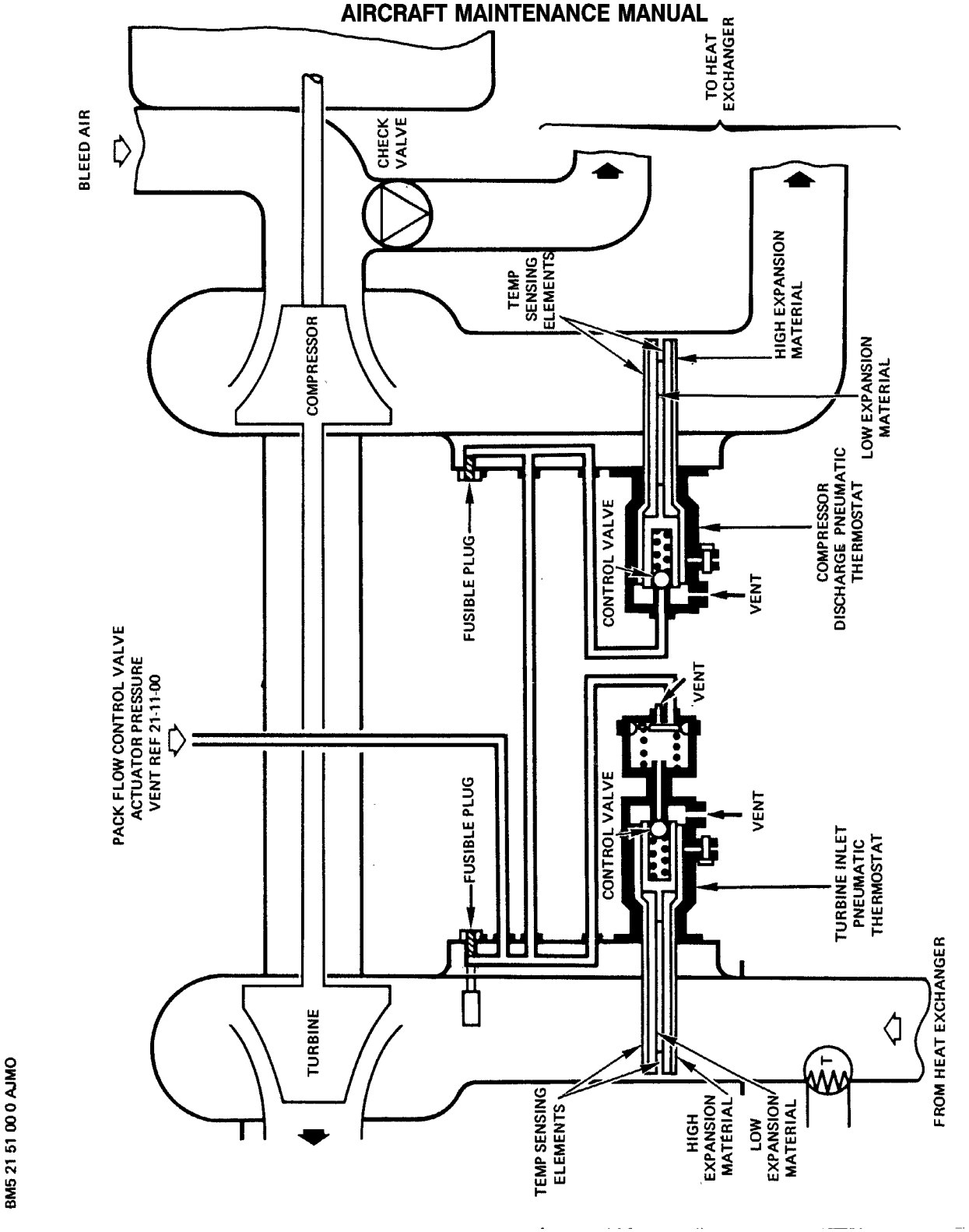
Anti Ice Valve - Schematic
Figure 004



Refrigeration Unit Pack Overheat Protection - Schematic
Figure 005

guide in the control valve follows the reaction of the sensing elements and allows a check ball to move off its seat.
The opening created vents pack flow control valve actuator pressure ; the valve reduces or shuts off the pneumatic supply to the refrigeration unit pack.

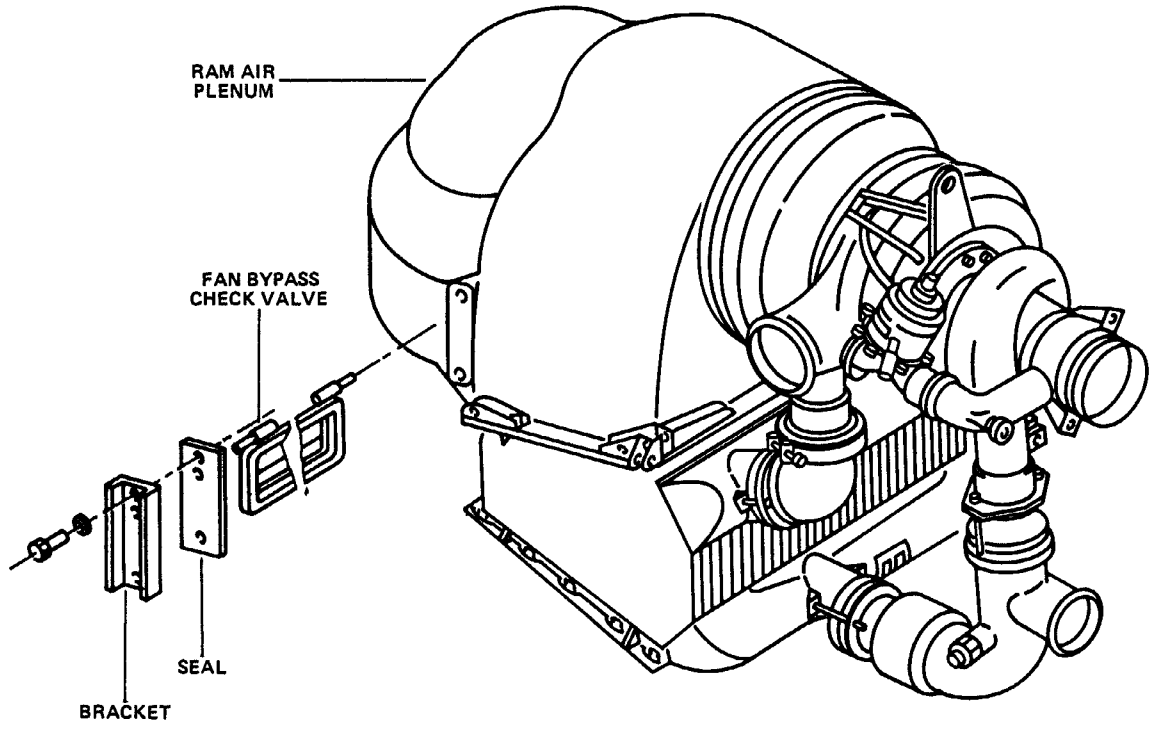
(6)Compressor discharge and turbine inlet overtemperature fusible plugs
(Ref. Fig. 005)
In the event of failure of either thermostat and excessive temperature, the fusible plug at the compressor outlet or at the turbine inlet melts and vents pneumatic pressure from the pack flow control valve actuator ; the valve closes and shuts off air supply to the refrigeration unit pack.
The fusible plug is nonresettable and improper installation is prevented by the mounting boss being of different sizes.

(7)Fan bypass check valve
(Ref. Fig. 006)
The valve is mounted in the ram air plenum assembly by means of supporting brackets.
The valve will open during all operating conditions when ram air exceeds the fan capacity. Conversely, the valve will close when ram air is insufficient to maintain positive pressure upstream of the fan and prevents recirculating airflow from fan outlet to fan inlet. Slots in either end of the hinge pins provide a means of visually determining valve position and freedom of movement.

(8)Heat exchanger
(Ref. Fig. 007)
The heat exchanger cools the air from the compressor by mixing it with cold ram air.
The heat exchanger assembly is of the normal air to air type. Hot air from the compressor enters the heat exchanger where it meets cool air from an external cooling air inlet when in flight, and from the cooling turbine fan on the ground.
The alternate passage of hot air and cold air in the heat exchanger enables the bleed air to be cooled.

B. Water Separator
(Ref. Fig. 008)
The water separator operates by inertia and removes moisture from the cold turbine discharge air.
Cold turbine discharge air enters the water separator and encounters the coalescer which coalesces the water particles into larger droplets which are projected under centrifugal action onto the perforated collector ring. Water is then discharged through a drain port at the bottom of the separator. If the coalescer is clogged or iced up, pressure at the separator inlet builds up, the bypass valve opens thus causing excess air to flow through.

C. Water Injector
Water collected at the base of the cooling turbine and water separator is drained and sprayed into the heat exchanger inlet by two water injectors. Sprayed water evaporates and provides additional cooling effectiveness by the heat exchanger.



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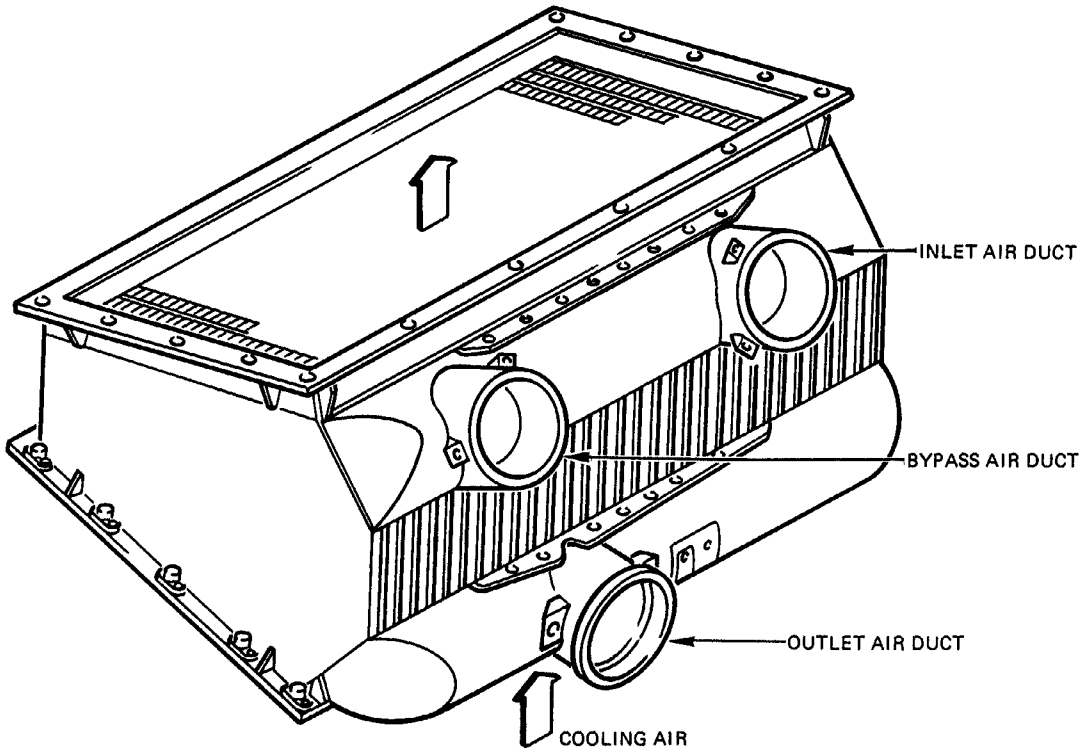
Fan Bypass Check Valve
Figure 006



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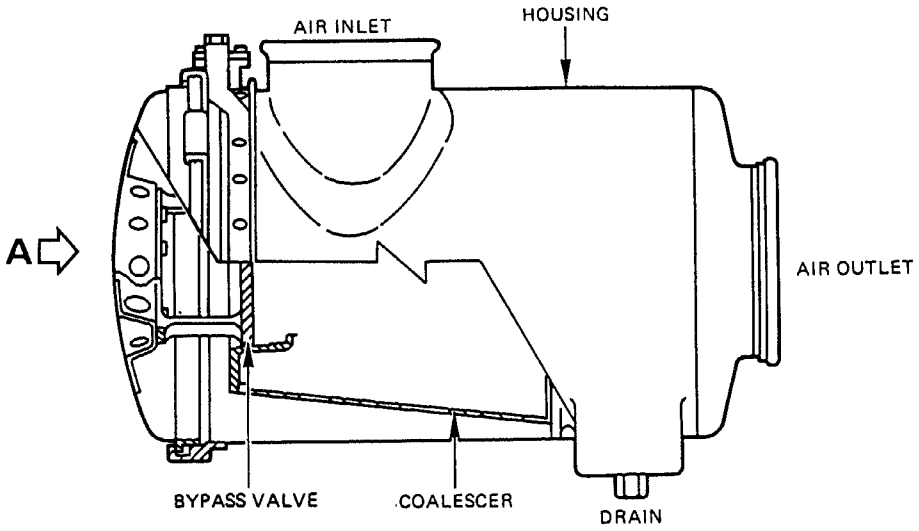
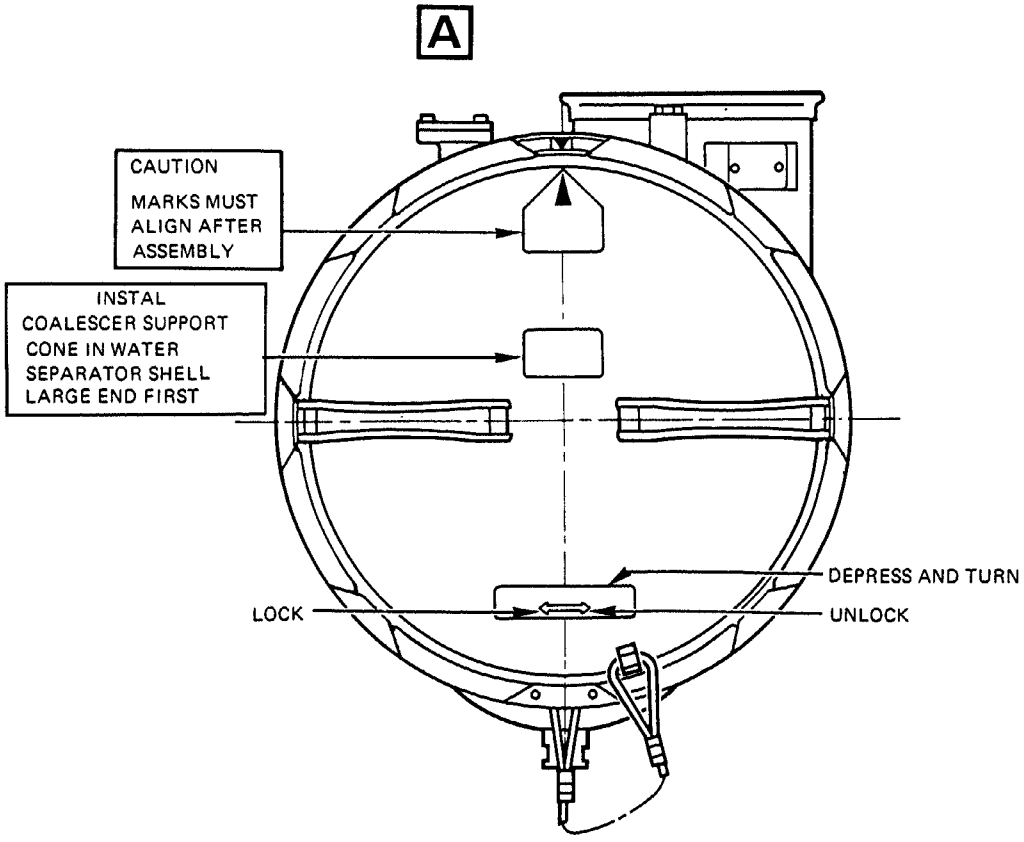
Heat Exchanger
Figure 007





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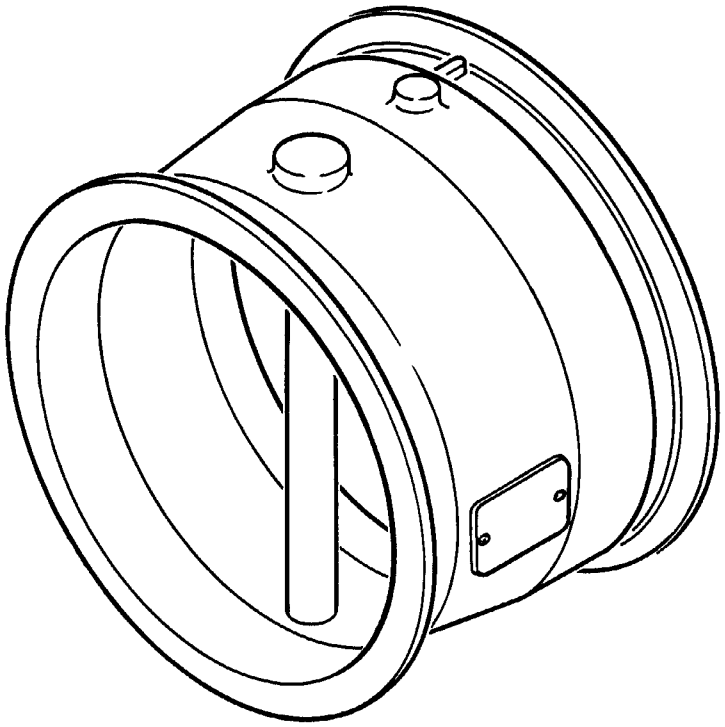
Water Separator
Figure 008

D. Anti Ice Screen
The anti ice screen functions to prevent an icing condition from developing in the turbine and water separator.
The screen consists of a metallic grille ; the screen becomes blocked by the water droplets suspended in the cold airflow when the air temperature reaches freezing point. Consequently, when the temperature is below freezing point, the difference in pressure upstream and downstream of the screen causes the anti ice valve to open, thus allowing hot air to enter the turbine outlet.

E. Cold Air Manifold Check Valve
(Ref. Fig. 009)
The check valve prevents backflow of air from the cold air manifold to the water separator and cabin depressurization in the event of ducting rupture in the unpressurized zone.
The check valve is of the two semi-circular flap type spring-loaded closed.

F. Deflect Door Actuator
(Ref. Fig. 010)
The actuator controls a deflect door designed to blank off the external cooling air inlet to the heat exchanger during the takeoff and landing phases.
The actuator is pneumatically actuated and electrically controlled by a solenoid. When the solenoid is energized, the pneumatic pressure causes the actuator to extend. When the solenoid is de-energized, the actuator retracts under the load exerted by a spring.
A manual locking device is incorporated to lock the actuator in the retracted position. The locking device is provided with detents to enable selection of locking or normal operation position of the actuator.
Locking is achieved by rotating finger clip 60° clockwise. A red dot is visible and indicates that the actuator is manually locked.



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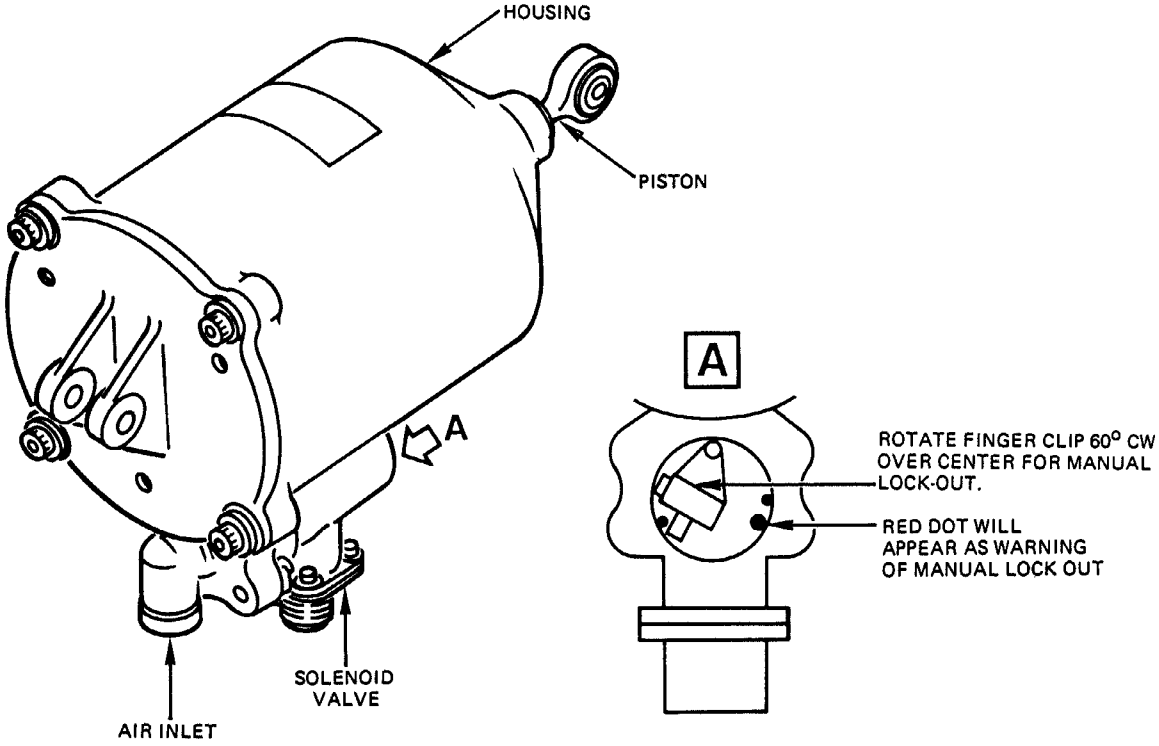
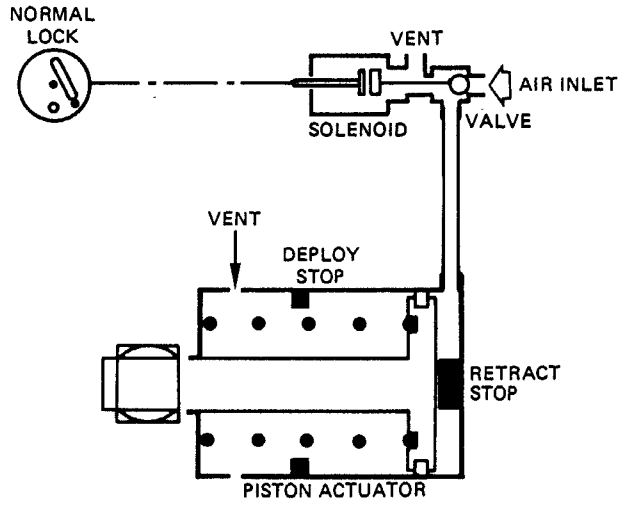
Cold Air Manifold Check Valve
Figure 009





BM5 21 51 00 0 ARMO

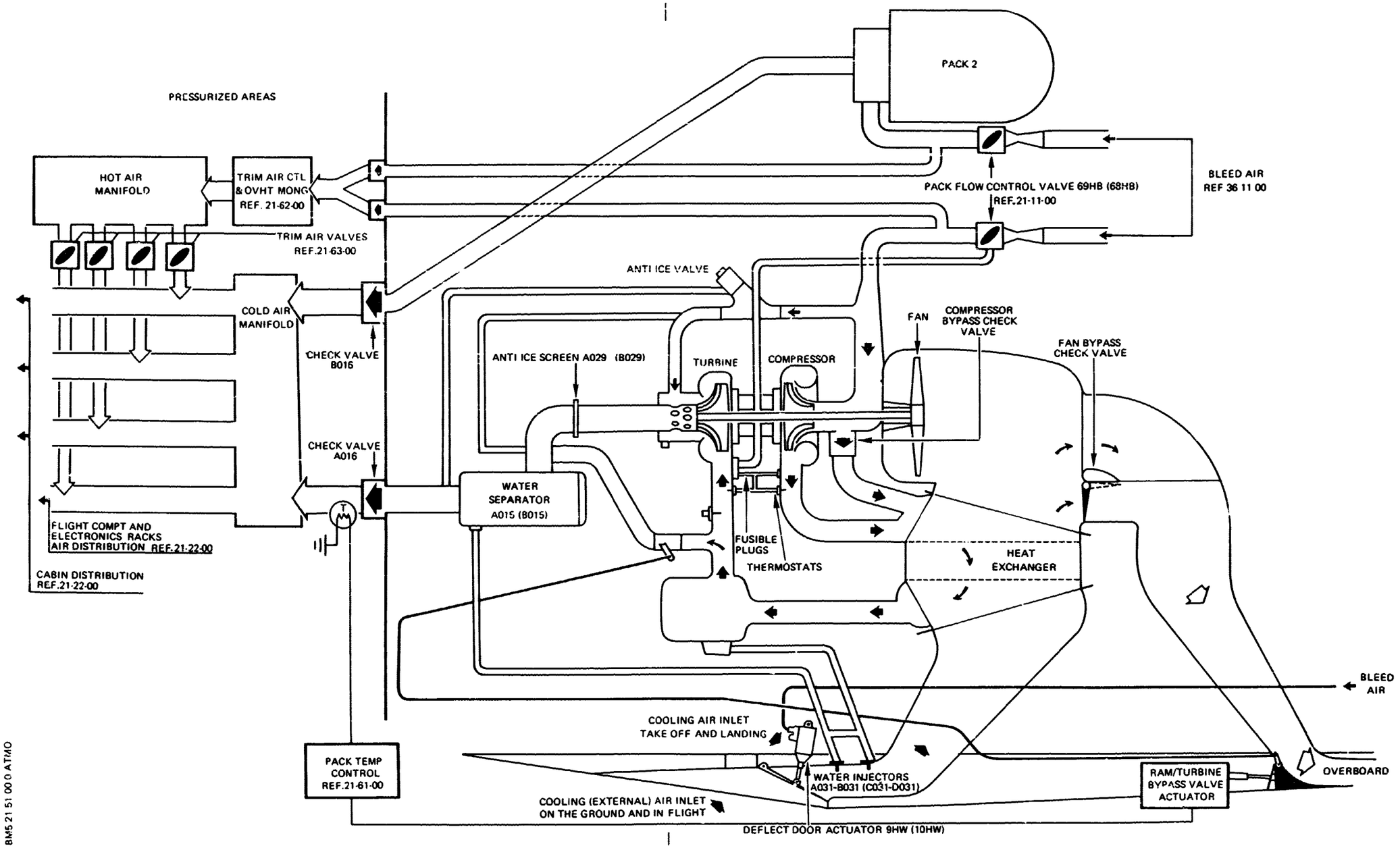
Deflect Door Actuator
Figure 010

5. Operation

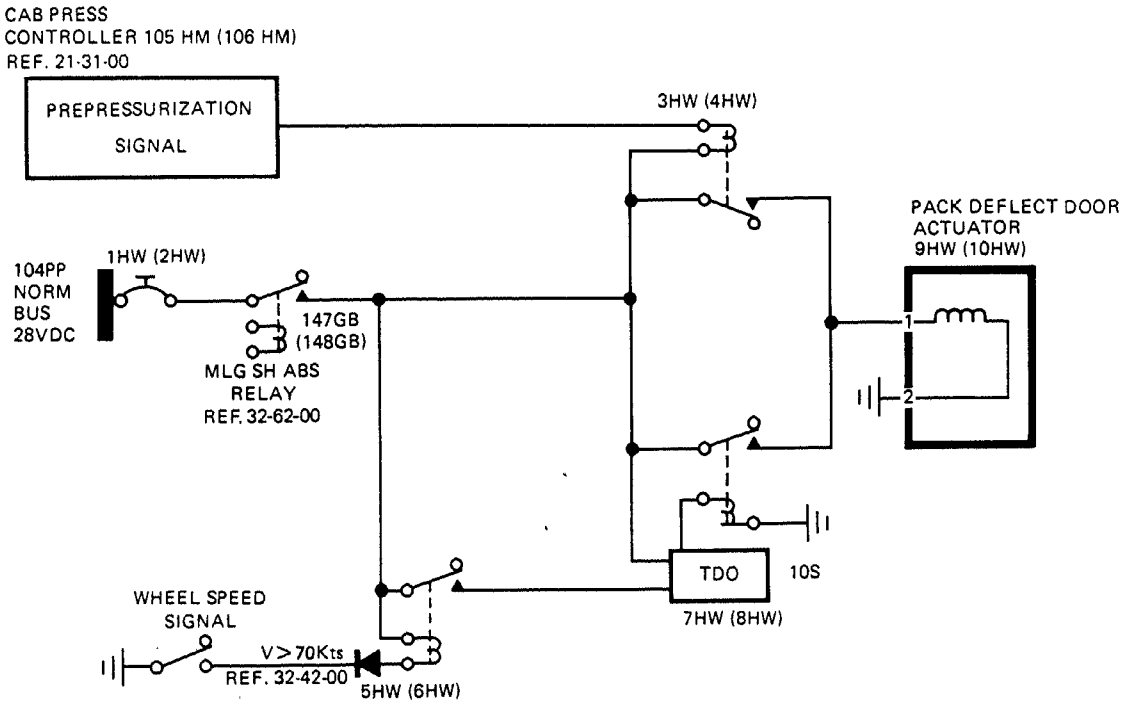
A. Air Cooling
(Ref. Fig. 011)
The air discharged from the pack flow control valve enters the refrigeration unit pack compressor where it is compressed. It is then cooled in the heat exchanger and expands in the turbine.
The hot airflow passing through the heat exchanger is cooled by cold ram air from a cooling air inlet.
The fan, mounted on the same shaft as the turbine circulates the cooling air which is bypassed by a check valve when the fan is rotating at low speed. The cooling air is then exhausted overboard through the cooling air outlet modulation flap which is controlled by the pack temperature control system (Ref. 21-61-00).
Before entering water separator A015 (B015), the cold turbine discharge air is mixed with the turbine bypass air (air mixing controlled by the pack temperature control system, Ref. 21-61-00). The air then enters the water separator where condensed water is removed and sprayed into the cooling air inlet duct upstream of the heat exchanger through water injectors A031 and B031 (C031 and D031).
In the event of ice formation, anti ice screen A029 (B029) installed upstream of the water separator causes the anti ice valve to open in order to regulate the hot airflow at the turbine outlet. The cold air discharged from the water separator flows through check valve A016 (B016) before being collected in a cold air manifold common to both packs prior to distribution to the cabin zones.

B. Overheat Protection
The overheat protection devices act on the flow control valve to reduce or shut off hot air supply to the refrigeration unit pack.
As the compressor discharge temperature reaches 282°C (540°F), the compressor discharge pneumatic thermostat actuates to reduce the airflow and, if temperature reaches 299°C (570°F), the thermostat causes air supply to be shut off.
When the turbine inlet temperature reaches 121 ±3°C (250 ±7°F), the turbine inlet pneumatic thermostat which operates in parallel with the compressor discharge pneumatic thermostat actuates to completely shut off air supply to the pack.
When temperature returns to normal, the pack flow control valve opens automatically to ensure the normal flow control function.
If the thermostats are disabled and compressor discharge temperature reaches 304°C (580°F) or turbine inlet temperature reaches 135°C (275°F), fusible plugs melt thus causing a complete and irreversible shutoff of air supply to the pack and thereby pack shutdown.

C. Pack Deflect Door Actuator
(Ref. Fig. 012)
During the takeoff and landing phases, the external cooling air inlet is blanked off by the deflect door controlled by actuator 173HB(172HB) ; cooling air is then bled from the air conditioning compartment.
The deflect door is extended (external cooling air inlet blanked off) in



Air Cooling - Airflow Diagram
Figure 011



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Pack Deflect Door Actuator - Schematic
Figure 012

the following cases :
- at takeoff during the pre-pressurization sequence, i.e. with the two engines running and as soon as full throttle is applied to one engine at least ; the deflect door remains extended until the main gear lifts off.
- at landing, at wheel touch down (main gear shock absorber compressed) ; the deflect door remains extended as long as taxiing speed is higher than 70 kts plus a 10 second time delay.

The deflect door retracts (external cooling air inlet open) in the following cases :
- on the ground at engine low speed
- when the aircraft is at a halt or at low taxiing speed
- in flight.

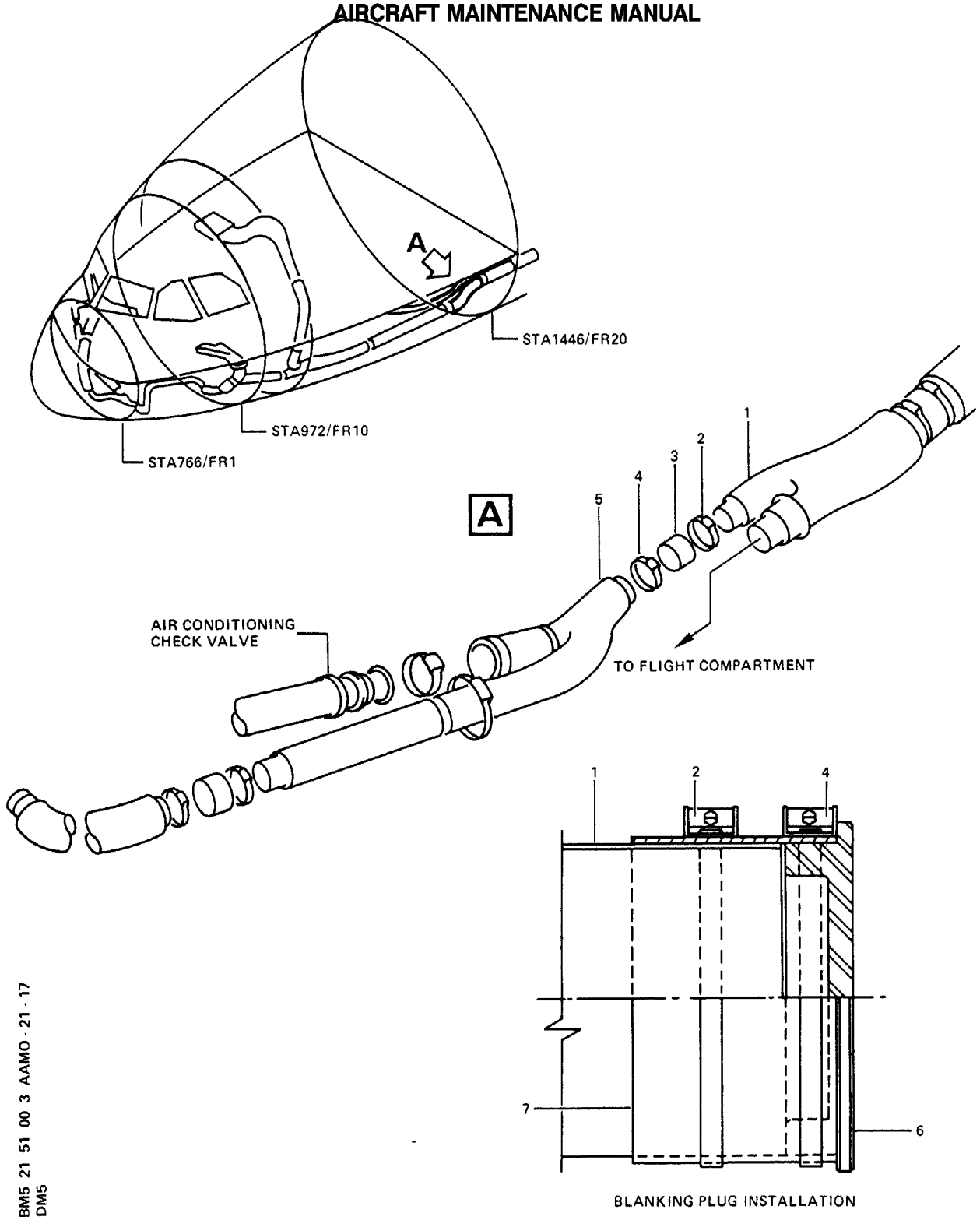
1. Reason for the Job
   To clean air conditioning ducts when :
   - the engine or APU is removed following engine or APU oil overconsumption
   - oil contamination of ducts is evidenced
   - oil smells are noticed in cabin.
   CAUTION : IN CASE OF CONTAMINATION BY SKYDROL REF. 20-41-11, P. Block 1.

2. Equipment and Materials

ITEM	DESIGNATION
A. 98A21003005100	Blanking Plug
B.	Access Platform
Referenced Procedures	
- 20-41-11, P. Block 1	Titanium Items
- 21-51-16, P. Block 301	Water Separator
- 21-63-16, P. Block 401	Zone Inlet Temperature Control Sensor 29HK
- 24-41-00, P. Block 301	AC External Power Control
- 32-12-11, P. Block 301	Main Gear Main Door
- 49-00-00, P. Block 501	Airborne Auxiliary Power
- 71-00-00, P. Block 501	Power Plant - General

3. Procedure
   (Ref. Fig. 301)

A. Job Set-Up
   (1)On air conditioning duct supply to electronic racks (avionics compartment) :
      - remove clamps (2) and (4), flexible sleeve (3) and duct (5).
      - on duct (1), install tooling sleeve (7) and blanking plug (6) and secure them using existing clamps (2) and (4).
   (2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
   (3)Make certain that electronics racks ventilation is correct.
   (4)Make certain that circuit breakers are closed, particularly those associated with VENT, COMPT TEMP, AIR BLEED, VENTILATION, AIR BLEED and COMPT TEMP, CABIN PRESS, ECAM.
   (5)On AIR BLEED section of panel 436VU
      - check that BLEED VALVE/ENG1 and ENG2 pushbutton switches are pressed (in) (AUTO).
      - check that HP VALVE/ENG1 and ENG2 pushbutton switches are pressed (in).
      - check that APU BLEED switch is in OFF/R position.
   (6)On COMPT TEMP panel 437VU
      - check that PACK VALVE 1 and PACK VALVE 2 pushbutton switches are released (out). OFF legend on.
      - check that temperature selectors are in AUTO position.
      - check that HOT AIR SUPPLY pushbutton switch is pressed (in).
      - check that RAM AIR pushbutton switch is released (out).
   (7)On PACK TEMP panel 441VU



Blanking Plug Installation
Figure 301

- check that PACK1 MODE SEL and PACK2 MODE SEL pushbutton switches are pressed (in) (AUTO).

(8)On ANTI ICE section of panel 426VU
- release WING SUPPLY pushbutton switch.

(9)On ENG START section of panel 429VU
- check that ENG START selector is in OFF position and that START 1 and START 2 pushbutton switches are released (out).

(10)On CAB PRESS panel 432VU
- check that OUTFLOW/FWD and AFT pushbutton switches are pressed (in) (both outflow valves open).

(11)Check that ENG 1 and ENG 2 FIRE handles are pushed.

(12)On ECAM control panel (center pedestal)
- press COND pushbutton switch (AIR COND page is displayed on R ECAM display unit).

(13)For pressurization with APU

(a)On panel 131VU
- open COCKPIT & MID CAB/AUTO CTL circuit breaker 4HK (location 313/F54).

(b)In forward cargo compartment
- remove access door 131HW.

(c)Disconnect and cap electrical connector 29HK-A from cockpit inlet temperature control sensor (Ref. 21-63-16, P. Block 401).

(d)Close circuit breaker 4HK.

B. Test

(1)Pressurize pneumatic system using APU
- start APU (Ref. 49-00-00, P. Block 501).

ACTION	RESULT
On AIR BLEED panel 436VU - place APU BLEED switch in ON position	- flowbar on APU BLEED annunciator comes on - X FEED valve position pushbutton switch flowbar is in line.
On panel 437VU - press PACK VALVE 1 and PACK VALVE 2 pushbutton switches	OFF legends of PACK VALVE 1 and PACK VALVE 2 pushbutton switches go off and flowbars come on.
On PACK TEMP panel 441VU - release PACK 1 MODE SEL and PACK 2 MODE SEL pushbutton switches.	On PACK TEMP panel 441VU - MAN legend comes on
- hold PACK 1 and PACK 2 manual temperature control selectors in COLD position	On AIR BLEED page - turbine by pass valve position arrows indicate C - pack discharge temperature indication decreases.
- after 10 min., hold PACK 1 and	- turbine by pass valve position

ACTION	RESULT
PACK 2 temperature selectors in HOT position	arrows goes to H. - pack discharge temperature indication increases
NOTE : Turbine inlet temperature must not exceed 121°C. NOTE : Pack discharge temperature must not exceed 80°C.	
- after 10 min., press PACK 1 MODE SEL and PACK 2 MODE SEL pushbutton switches (AUTO)	- turbine by pass valve position arrows are at initial position - pack discharge temperature indication reads initial value.

On COMPT TEMP panel 437VU

- place COCKPIT, FWD CABIN, MID
R CABIN, AFT CABIN, BULK CARGO temperature selectors in the full AUTO HOT position for 10 min. approx.

NOTE : Duct temperature must not exceed 70°C, particularly COCKPIT.

R NOTE : Skydrol mist may cause Bulk Cargo Fire Warning to occur.
R Bulk and/or AFT Cargo Door should be opened to evacuate area, before
R system is reset and test continued.

- after 10 min., place COCKPIT,
R FWD CABIN, MID CABIN, AFT CABIN,
R BULK CARGO temperature selectors in AUTO position.

NOTE : Repeat above action as many times as needed to eliminate smells and replace or clean coalescer bag (Ref. 21-51-16, P. Block 301).

(2)Pressurize pneumatic system using engines

(a)Perform engine 1 and engine 2 starting (Ref. 71-00-00, P. Block 501).

NOTE : - During test, the throttle controls must in principle be in the HP/IP transition position, resulting in an HP bleed temperature greater than 177°C associated with a low N1.
- This temperature is necessary for a good cleaning of the air conditioning packs.

ACTION	RESULT
- Place throttle levers in the required position.	
On panel 437VU - Press PACK VALVE 1 and PACK VALVE 2 pushbutton switches	OFF legends of PACK VALVE 1 and PACK VALVE 2 pushbutton switches go off and flowbars come on.
On PACK TEMP panel 441VU	On PACK TEMP panel 441VU

ACTION	RESULT
- release PACK 1 MODE SEL and PACK 2 MODE SEL pushbutton switches	- MAN legend comes on.
- hold PACK 1 and PACK 2 manual temperature control selectors in COLD position	On AIR BLEED page - turbine by pass valve position arrows indicate C - pack discharge temperature indication decreases.
- after 10 min., hold PACK 1 and PACK 2 temperature selectors in HOT position NOTE : Turbine inlet temperature must not exceed 121°C. NOTE : Pack discharge temperature must not exceed 80°C.	- turbine by pass valve position arrows goes to H. - pack discharge temperature indication increases
- after 10 min., press PACK 1 MODE SEL and PACK 2 MODE SEL pushbutton switches (AUTO)	- turbine by pass valve position arrows are at initial position - pack discharge temperature indication reads initial value.

On COMPT TEMP panel 437VU

- place COCKPIT, FWD CABIN, MID
R CABIN, AFT CABIN, BULK CARGO temperature selectors in the full AUTO HOT position for 10 min. approx.

NOTE : Duct temperature must not exceed 70°C, particularly COCKPIT.

R NOTE : Skydrol mist may cause Bulk Cargo Fire Warning to occur.
R Bulk and/or AFT Cargo Door should be opened to evacuate area, before
R system is reset and test continued.

- after 10 min., place COCKPIT,
R FWD CABIN, MID CABIN, AFT CABIN,
R BULK CARGO temperature selectors in AUTO position.

NOTE : Repeat above action as many times as needed to eliminate smells and replace or clean coalescer bag (Ref. 21-51-16, P. Block 301).

C. Close-Up

(1)Shut down air supply (Ref. 49-00-00, P. Block 501) (Ref. 71-00-00, P. Block 501).

(2)On air duct supply to electronic racks
- remove blanking plug (6) and tooling sleeve (7)
- make certain that O-ring is correctly installed on air conditioning

check valve.
- install sleeve (3) and duct (5).

(3)If cleaning procedure was performed by APU open circuit breaker 4HK, connect electrical connector 29HK-A and close circuit breaker 4HK.

(4)In forward cargo compartment
- install access door 131HW.

(5)Restore system and aircraft to normal operating condition.

R WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Operational Test

A. Reason for the Job

(1)To make certain that refrigeration unit packs operate correctly and to perform a leakage check of couplings and ducts in air conditioning compartment.

NOTE : The test can be carried out by means of one of the two conventional pneumatic sources :
- APU
- HP ground pneumatic source.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
- 49-00-00, P. Block 501	Airborne Auxiliary Power or HP Ground Air Supply Unit Having the Following Characteristics : - pressure between 3.1 and 3.4 bars (45 and 50 psi) - temperature between 180°C and 230°C (355°F and 445°F) - mass flow between 2.02 and 2.2 kg/s (4.2 and 4.8 lb/s)

C. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that electronics racks ventilation is correct.

(c)Make certain that overhead panel circuit breakers are closed, particularly those associated with VENT, COMPT TEMP, AIR BLEED, VENTILATION, AIR BLEED & COMPT TEMP, CABIN PRESS, ECAM.

(d)Aircraft on ground (LDG GEAR PROX DET & RELAYS circuit breakers closed).

(e)On AIR BLEED section of panel 436VU
- check that BLEED VALVE/ENG 1 and ENG 2 pushbutton switches are pressed (in) (AUTO)
- check that APU BLEED switch is in OFF/R position.

(f)On PACK TEMP panel 441VU
- check that PACK 1 MODE SEL and PACK 2 MODE SEL pushbutton switches are pressed (in) (AUTO).

(g)On COMPT TEMP panel 437VU

- check that temperature selectors are in AUTO position
- check that HOT AIR SUPPLY pushbutton switch is pressed (in)
- check that RAM AIR pushbutton switch is released (out).

(h)On ANTI ICE section of panel 426VU
- release WING/SUPPLY pushbutton switch.

(i)On ENG START section of panel 429VU
- check that ENG START selector is in OFF position and that START 1 and START 2 pushbutton switches are released (out).

(j)On CABIN PRESS panel 432VU
- check that OUTFLOW/FWD and AFT pushbutton switches are pressed (in) (both outflow valves open).

(k)Check that ENG1 and ENG2 FIRE handles are pushed.

(l)Open main gear main door (Ref. 32-12-11, P. Block 301).

R (m)Open air conditioning compartment access door 147BZ.

(n)Pressurize pneumatic system

. Using APU
- start up APU (Ref. 49-00-00, P. Block 501).

On AIR BLEED section of panel 436VU
- place APU BLEED switch in ON position (flowbar on APU BLEED annunciator comes on)
- check that X FEED valve position pushbutton switch flowbar is in line.

. Using HP ground pneumatic source
- connect HP ground air supply unit to HP ground connector.

NOTE : To carry out this procedure and to test the right refrigeration unit pack only, open the crossfeed valve as follows :

On AIR BLEED section of panel 436VU :
- release X FEED mode pushbutton switch (MAN legend on)
- press X FEED valve position pushbutton switch (flowbar in line).

(2)Test

R WARNING : PUT ON PROTECTIVE GOGGLES AND THERMAL GLOVES WHEN YOU GO
R NEAR AN AIR-CONDITIONING PACK WHEN IT OPERATES. THERE CAN BE
R LEAKAGE OF HOT AIR, WHICH CAN CAUSE INJURIES.

ACTION	RESULT
1. For pressurization by APU, on AIR BLEED section of panel 436VU - place APU BLEED switch in ON position	- flowbar of APU BLEED annunciator comes on - FAULT legend of X FEED mode push-button switch comes on during valve transit then goes off - flowbar of X FEED valve position pushbutton switch is in line - AIR BLEED/PRESS indicator reads between 20 and 30 psi.
2.On COMPT TEMP panel 437VU - press PACK VALVE 1 (PACK VALVE 2) pushbutton switch	- OFF legend goes off - flowbar comes on. On AIR BLEED page (ECAM)

ACTION	RESULT
	- note position of turbine bypass valve indicating arrow - pack 1 (2) flow control valve is indicated open. - indication of inlet airflow - pack discharge and turbine inlet temperature indications are normal. In air conditioning compartment, check that there is no evidence of leaks on ducts, sense lines and at each coupling.
3. On **PACK TEMP** panel 441VU - release **PACK 1 MODE SEL (PACK 2 MODE SEL)** pushbutton switch	- **MAN** legend comes on.
4. Hold **PACK 1 (PACK 2)** manual temperature control selector switch in **HOT** position	On **AIR BLEED** page (ECAM) - turbine bypass valve position arrow moves to H position. - pack discharge temperature indication increases.
- as soon as pack discharge temp indication increases, press **PACK 1 MODE SEL (PACK 2 MODE SEL)** pushbutton switch **(AUTO).**	- **MAN** legend goes off. On **AIR BLEED** page (ECAM) - turbine bypass valve indicating arrow is at initial position - pack discharge temperature indication reads initial value.
5. Release **PACK 1 MODE SEL (PACK 2 MODE SEL)** pushbutton switch	- **MAN** legend comes on.
6. Hold **PACK 1 (2)** manual temperature control selector switch in **COLD** position until turbine bypass valve position arrow indicates **C** on **AIR BLEED** page.	On **AIR BLEED** page (ECAM) - pack discharge temperature indication decreases.
7. Press **PACK 1 MODE SEL (PACK 2 MODE SEL)** pushbutton switch **(AUTO)**	- **MAN** legend goes off. On **AIR BLEED** page (ECAM) - turbine bypass valve indicating arrow is at initial position - pack discharge temperature indication reads initial value.

(3)Close-up
(a)On **COMPT TEMP** panel 437VU

- release PACK VALVE 1 (PACK VALVE 2) pushbutton switch (OFF legend comes on and flowbar goes off).

(b)Shut down air supply

1 Air supply by APU

- place APU BLEED switch in OFF/R position (flowbar on APU BLEED annunciator is off).
- shut down APU (Ref. 49.00.00, P. Block 501).

2 Air supply by ground air pre-conditioning unit.

On AIR BLEED panel 436VU

- release X FEED VALVE position pushbutton switch (flowbar cross line)
- press X FEED mode pushbutton switch (MAN legend off)
- shut down and disconnect ground air pre-conditioning unit.

(c)Close access doors and main gear door (Ref. 32-12-11, P. Block 301).

(d)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(e)Restore system and aircraft to normal operating condition.

WARNING : MAKE CERTAIN THAT THE REFRIGERATION UNIT PACKS DO NOT OPERATE.

1. Reason for the Job
General visual inspection of cooling air inlet and outlet structure and adjacent area.

2. Equipment and Materials

ITEM	DESIGNATION
A. Material No. 11-003	Cleaning Agents (Ref. 20-31-00)
B.	Cloth
C.	Access Platform
D.	Warning Notice

3. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Display a warning notice prohibiting operation of packs.
(3)Clean right and left cooling air inlets and outlets and adjacent area with Material No. 11-003.

B. Inspection/Check
Carefully inspect internal and external structure of cooling air inlets and outlets and adjacent area. Check for distortions, cracks, dents.

C. Close-Up
(1)Remove access platform.
(2)Remove warning notice.

ANTI ICE SCREEN A029 (B029) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

NOTE : Removal/installation procedures for anti ice screens A029 and B029 are identical.

1. Equipment and Materials

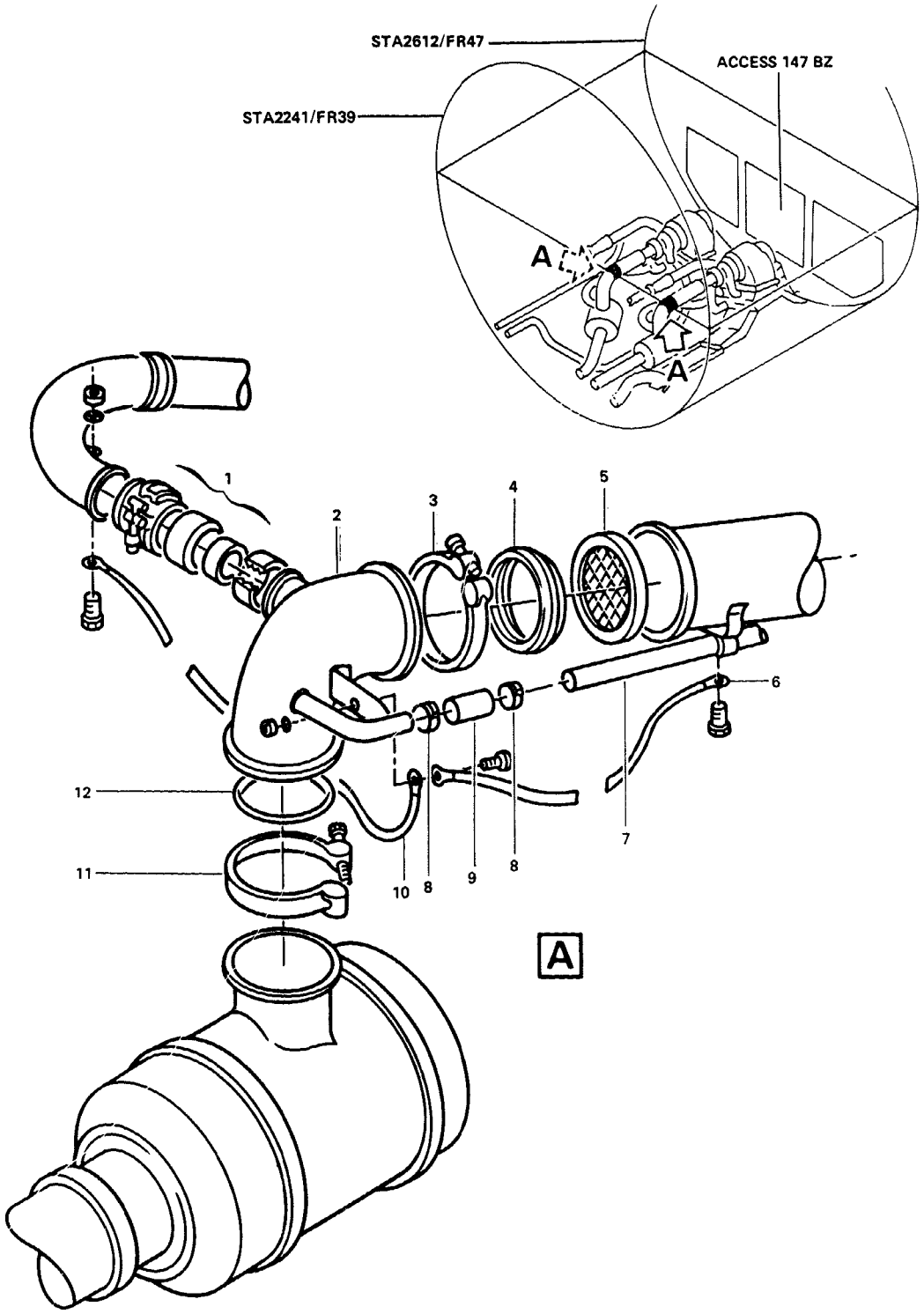
ITEM	DESIGNATION
A.	O-Ring
B.	Blanking Plugs/Caps
C.	Warning Notices
D.	Torque Wrench 0.80 m.daN (71 lbf. in.)
Referenced Procedure - 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Display warning notices prohibiting pressurization of pneumatic system.
(2)Open main gear door (Ref. 32-12-11, P. Block 301).
(3)Remove air conditioning compartment access door 147BZ.

B. Removal
(1)Disconnect the two bonding strips (6) and (10).
(2)Remove clamps (8) and slide flexible sleeve (9) onto duct (7).
(3)Loosen nut of coupling assembly (1) and remove coupling.
(4)Remove clamps (3) and (11).
(5)Remove elbow duct (2), remove and discard O-ring (12).
(6)Remove screen (5) and seal (4).
(7)Discard seal (4).
(8)Cap open duct ends.

C. Installation
(1)Remove blanking caps from ducts. Check for correct condition of duct flanges and flexible sleeve (9).
(2)Clean and inspect screen interface and/or adjacent area.
(3)Install screen (5) in new seal (4) and install assembly in its housing on duct flange (Convex surface of screen on water separator side).
(4)Install new O-ring (12) in groove on elbow duct (2) flange.
(5)Install elbow duct (2), making certain that screen is correctly installed in housing.
(6)Make certain that O-ring (12) is correctly installed in groove.
(7)Install flexible sleeve (9), install and tighten clamps (8).
(8)Install clamps (3) and (11); tighten nuts of clamps and TORQUE to value given on clamps.
(9)Install coupling assembly (1); tighten nut and TORQUE to value given on



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Anti Ice Screen
Figure 401

clamp.

(10)Connect bonding strips (6) and (10).

D. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/
R PANELS AT FR47.

(2)Install access door 147BZ.

(3)Close main gear door (Ref. 32-12-11, P. Block 301).

(4)Remove warning notices.

WATER INJECTOR A031 (B031) (C031) (D031) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

NOTE : Removal/Installation procedures for water injectors A031, B031, C031 and D031 are identical.

1. Equipment and Materials

ITEM	DESIGNATION
A.	O-Ring
B.	Blanking Plugs/Caps
C.	Warning Notices
D. Material No. 04-007	Common Greases (Ref. 20-31-00)
Referenced Procedure - 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

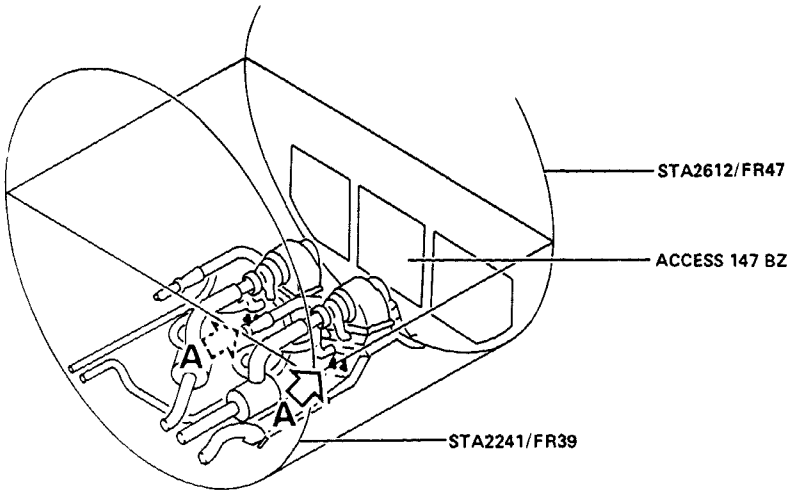
2. Procedure
(Ref. Fig. 401)

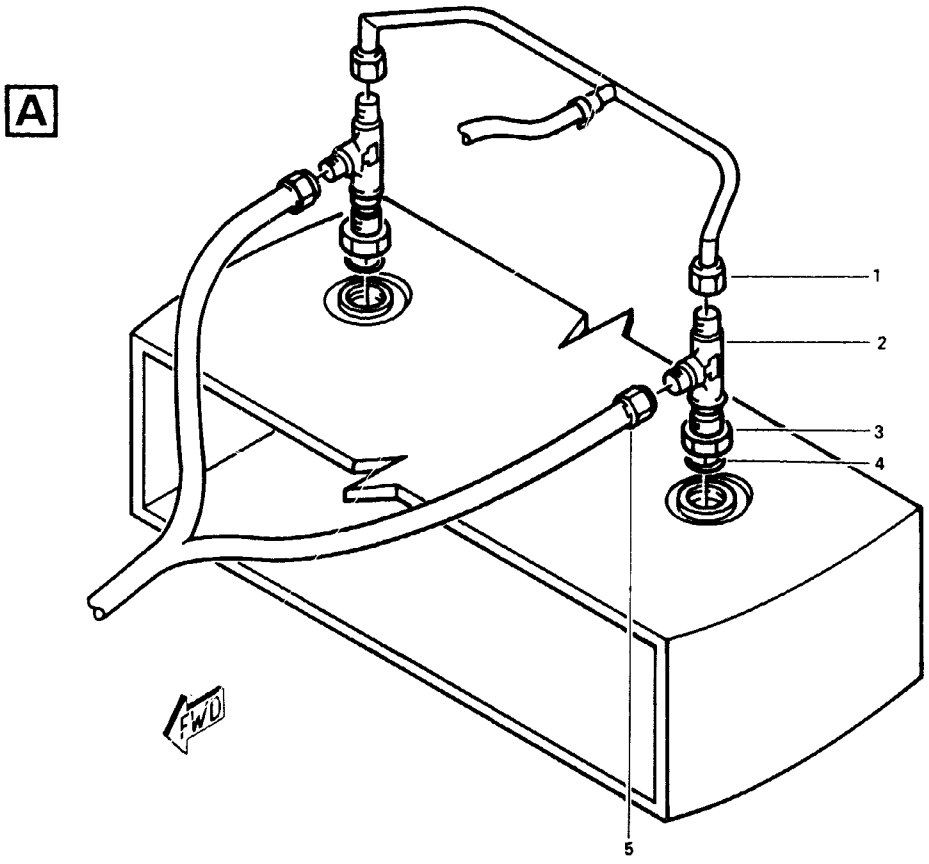
A. Job Set-Up
(1)Display warning notices prohibiting pressurization of pneumatic system.
(2)Open main gear door (Ref. 32-12-11, P. Block 301).
(3)Remove air conditioning compartment access door 147BZ.

B. Removal
(1)Disconnect drain hose (5) from water injectors.
(2)Disconnect pipe (1) connecting water injectors.
(3)Unlock nut (3) and remove water injector (2) from mounting base.
(4)Remove and discard O-ring (4).
(5)Remove nut (3) from water injector (2).
(6)Cap open ends of pipe and hose and blank off mounting base orifice.

C. Installation
(1)Remove blanking caps.
(2)Clean and inspect water injector interface and/or adjacent area.
(3)Smear water injector threads (2) with Material No. 04-007 ; install and fully tighten nut (3) on water injector.
(4)Install new O-ring (4).
(5)Install water injector (2) assembly on mounting base ; turn it so that hose (5) can be connected without excessive slack or stress (water injector center nozzle facing forward).
(6)Connect drain hose (5) to water injector nozzle.
(7)Connect pipe (1) connecting water injectors.
(8)Hold water injector (2) and install nut (3) on mounting base in order to lock assembly onto cooling air inlet duct.

D. Close-Up
(1)Make certain that working area is clean and clear of tools and





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Water Injector
Figure 401

miscellaneous items of equipment.

R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/
R PANELS AT FR47.

(2)Install access door 147BZ.
(3)Close main gear door (Ref. 32-12-11, P. Block 301).
(4)Remove warning notices.

COLD AIR MANIFOLD CHECK VALVE A016 (B016) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED

NOTE : Check valves A016 and B016 removal/installation procedures are identical.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.60 m (8 ft. 6 in.)
B.	Torque Wrench 0.6 m.daN (53 lbf.in.)
C.	Blanking Plugs/Caps
D.	O-Ring

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Position access platform.

(2)Open forward cargo compartment access door : remove access doors 131SW and 131RW.

(3)Remove floor panel 131GC.

B. Removal

(1)Remove clamp (5); loosen clamps (7) and slide flexible sleeve (6) onto duct (8).

(2)Loosen clamp (2).

(3)Hold check valve (4); open attachment clamp (2). Remove check valve (4) and remove and discard O-ring (3).

(4)Cap open duct ends

C. Installation

(1)Remove blanking caps and check for correct condition of duct flanges and flexible sleeve.

(2)Clean and inspect check valve interface and/or adjacent area.

(3)Install new O-ring (3)in its groove on bulkhead connection flange at FR39 (1).

(4)Install valve (4) between flexible sleeve (6) and FR39 bulkhead connection flange (1) with arrow indicating airflow direction pointing forward.

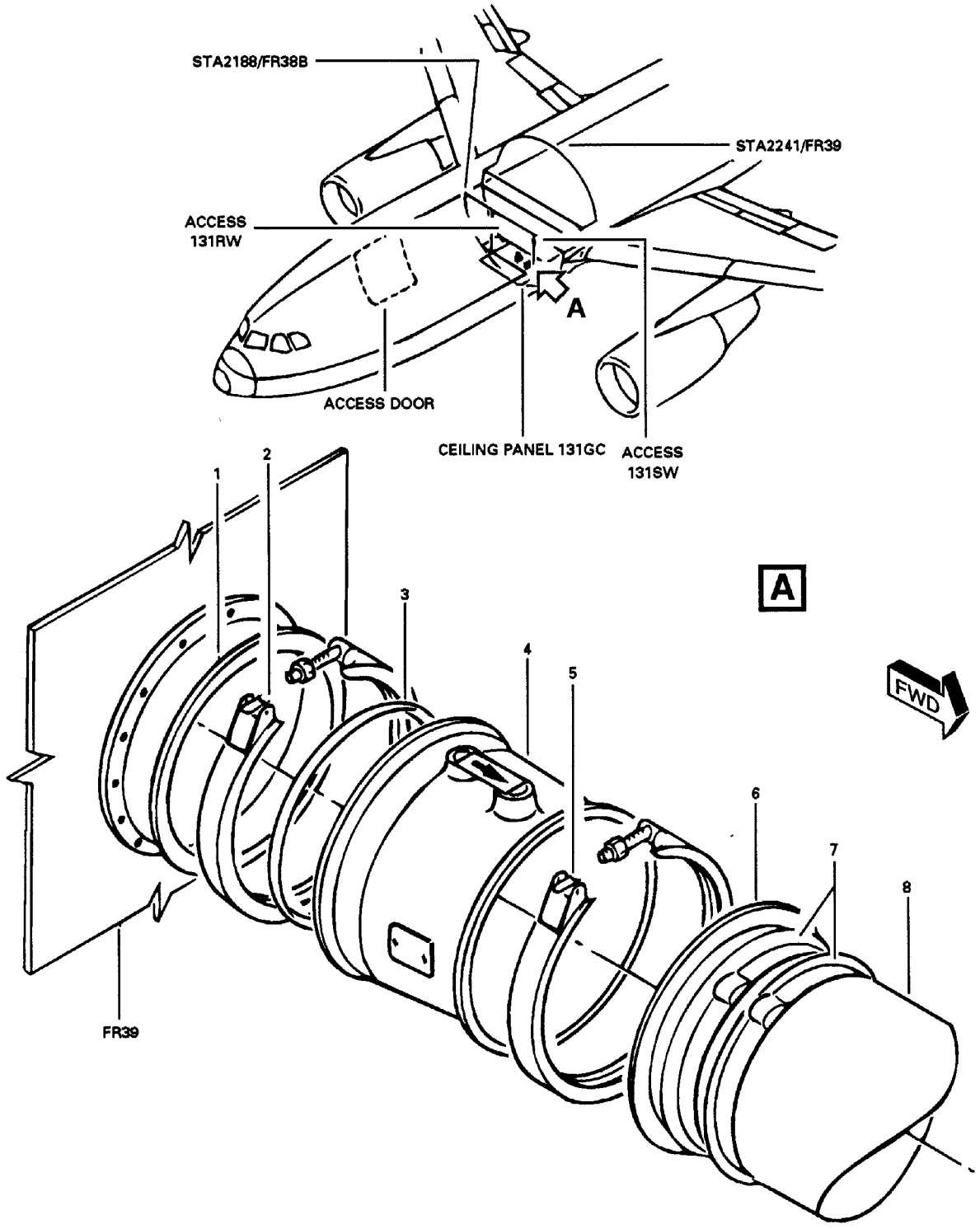
NOTE : Check valve angular setting is provided by means of a locating stud, arrow located at upper part.

(5)Make certain that O-ring is correctly installed in groove.

(6)Install attachment clamp (2) and TORQUE nut to value given on clamp.

(7)Install flexible sleeve (6), install clamp (5) and TORQUE to value given on clamp

(8)Tighten clamps (7).



Cold Air Manifold Check Valve
Figure 401

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Install floor panel 131GC and close access doors 131SW and 131RW.
(3)Remove access platform.

COLD AIR MANIFOLD CHECK VALVE - INSPECTION/CHECK

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT SYSTEM IS DEPRESSURIZED.

1. Reason for the Job

R To check for wear and freedom of flapper of non return valve.

2. Equipment and Materials

Referenced Procedure

- 21-51-15, P. Block 401 Cold Air Manifold Check Valve

3. Procedure

A. Removal of Check Valve (Ref. 21-51-15, P. Block 401).

R B. Check for correct condition of check valve, especially the two semi-
R circular flaps, hinge pin, tension spring. Check that check valve bears
R no traces of corrosion ; cracks or dents.
R Manually check that check valve operates correctly. Push flaps to make
R certain they can move to fully open or fully closed position with no hard
R point, and seat correctly.

C. Install check valve (Ref. 21-51-15, P. Block 401).

WATER SEPARATOR A015 (B015) - SERVICING

1. Reason for the Job

A. Replacement or cleaning of water separator coalescer.

2. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform 2.6 m (8 ft. 7 in.)
	B.	Warning Notice
	C.	Mild Detergent
R	D. Material No.11-507	Detergents, General Purpose
R	E. Material No.11-513	Detergent Liquid
R	F. Material No.11-514	Detergent
	Referenced Procedure	
	- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

3. Procedure

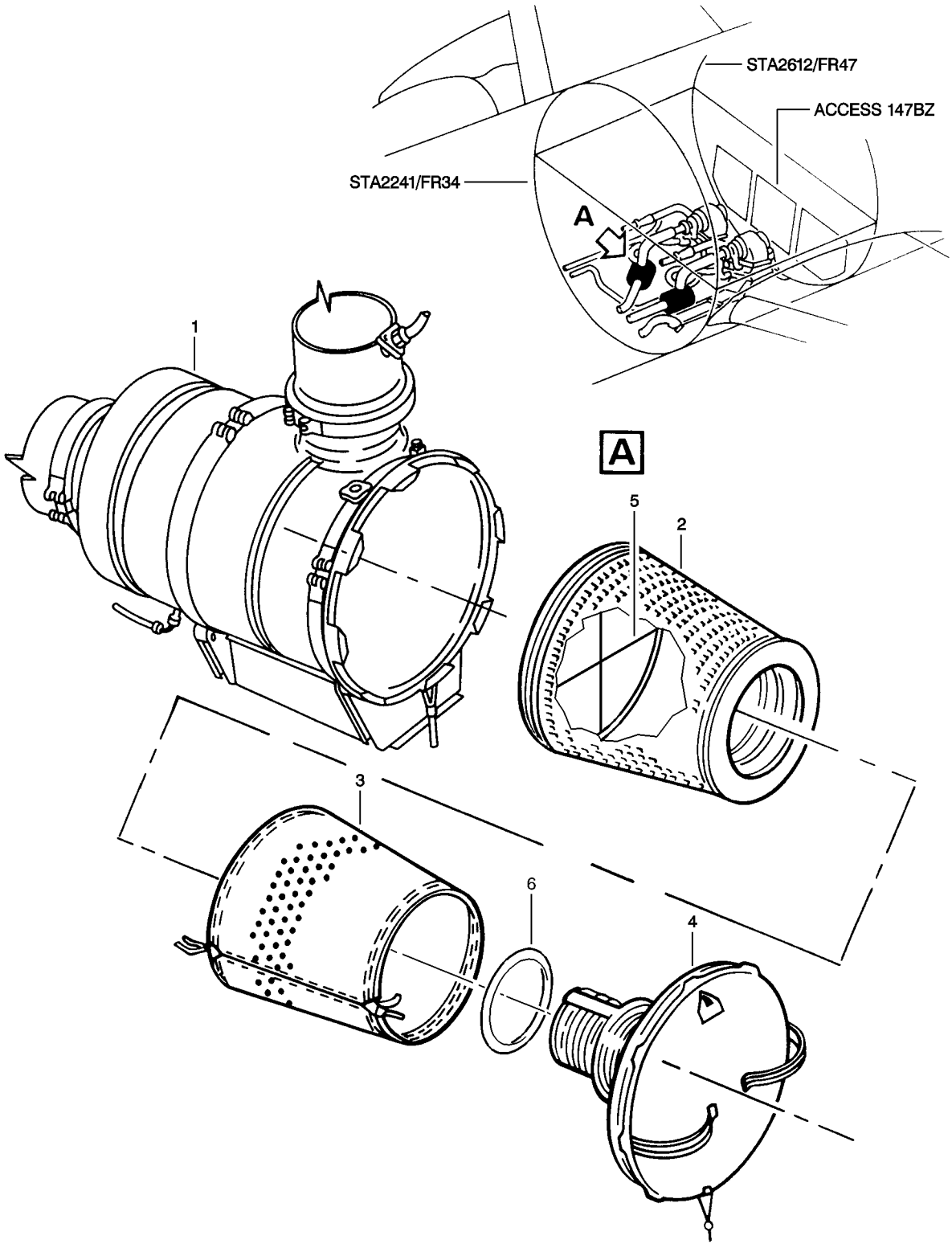
A. Job Set-Up
(1)On COMPT TEMP panel 437VU
- Make certain that PACK VALVE 1 and 2 pushbutton switches are released (out).

(2)Display warning notices prohibiting pressurization of pneumatic system.
(3)Open main landing gear door (Ref. 32-12-11, P. Block 301).
(4)Position access platform.
(5)Remove air conditioning compartment access door 147BZ.

B. Removal
(Ref. Fig. 301)
NOTE : Instructions for removal/installation are written on water separator cover.

(1)Remove cover (4).
(2)Remove coalescer assy from housing (1).
(3)Untie cords at each end of coalescer bag (3) ; remove coalescer bag (3) from coalescer (2).

C. Check/Cleaning
(1)Check coalescer bag for evidence of damage or contamination.
R (a)Replace coalescer bag if damaged.
R (b)If contaminated, wash coalescer bag as follows :
R CAUTION : EXCESSIVE CLEANING CAN CAUSE DAMAGE TO COALESCER BAG.
R CAUTION : DO NOT APPLY TO COALESCER BAG. HEAT CAN CAUSE DAMAGE TO COALESCER FABRIC.
R CAUTION : DO NOT RUB OR STRETCH COALESCER BAG.
R 1 Return coalescer bag to overhaul facility and clean it with detergent Material No.11-507, Material No.11-514 or liquid detergent Material No.11-513
R NOTE : It is recommended that coalescer bag be replaced after three



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Water Separator
Figure 301

R

R cleanings.

D. Installation

CAUTION : PUT COALESCER BAG (3) OVER COALESCER (2) WITH THE LARGE HEM ALIGNED IN RECESS OF THE LARGER END OF COALESCER. PULL CORD IN COALESCER BAG HEM TIGHT AND TIE IN A SHOE STRING KNOT TO SAFETY COALESCER BAG.

(1)Install coalescer bag (3) on coalescer (2) and tie cords.
(2)Installation of the coalescer assy
CAUTION : MAKE SURE THAT THE COALESCER (2) IS CORRECTLY INSTALLED IN ORDER NOT TO DAMAGE THE CROSS WIRE (5) WITH THE COVER (4).
(a)Install coalescer assy large end first in housing (1).
(3)Make sure that seal (6) is correctly installed on valve (7).
(4)Install cover (4).

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/ PANELS AT FR47.
(2)Install access door 147BZ.
(3)Close main gear door (Ref. 32-12-11, P. Block 301).
(4)Remove access platform.
(5)Remove warning notices.

WATER SEPARATOR 21A015 (21B015) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

NOTE : Removal/installation procedures for water separators 21A015 and 21B015 are identical.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.60 m (8 ft. 6 in.)
B.	O-Rings
C.	Blanking Plugs/Caps
D.	Warning Notices
E.	Torque Wrench 0.80 m.daN (71 lbf.in.)
F. Material No. 04-007	Common Greases (Ref. 20-31-00)

Referenced Procedure

- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

2. Procedure

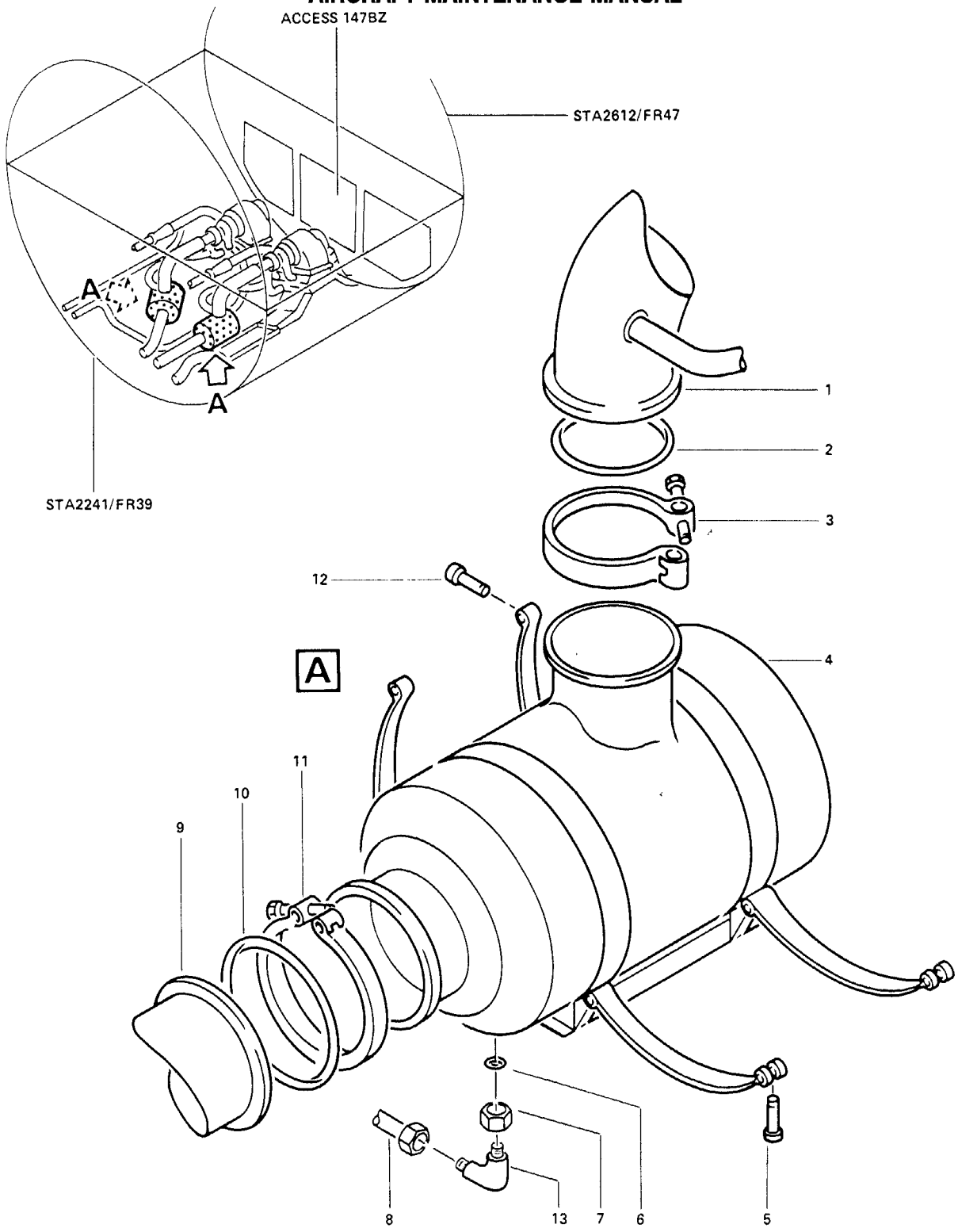
(Ref. Fig. 401)

A. Job Set-Up
  (1)On COMPT TEMP panel 437VU
    - make certain that PACK VALVE 1 and 2 pushbutton switches are released (out).
  (2)Display warning notices prohibiting pressurization of pneumatic system.
  (3)Open main landing gear door (Ref. 32-12-11, P. Block 301).
  (4)Position access platform.
  (5)Remove air conditioning compartment access door 147BZ.

B. Removal
  WARNING : TO REMOVE OR INSTALL DRAIN LINE OR UNION ON WATER SEPARATOR, USE A BACK-UP WRENCH ON WRENCH PADS PROVIDED ON OUTLET PORTS TO PREVENT POSSIBLE DAMAGE TO WATER SEPARATOR CASING.
  (1)Remove clamps (3) and (11).
  (2)Disconnect drain line (8).
  (3)Remove screws (5) and (12) and clear straps attaching water separator.
  (4)Remove water separator (4) from mounting.
  (5)Remove and discard o-rings (2) and (10).
  (6)Cap open duct and drain line ends.

C. Preparation of Replacement Component
  (1)Clean and check for correct condition of union (13) retained from removed component and install on replacement component with new O-ring (6). Smear union threads with Material No. 04-007. Do not tighten nut (7).

D. Installation
  (1)Clean on inspect water separator interface and/or adjacent area.



Water Separator
Figure 401

(2)Remove blanking caps. Make certain that duct (1) and (9) flanges, straps and water separator mounting are in good condition.
(3)Install new o-rings (2) and (10) in grooves on flanges of ducts (1) and (9).
(4)Install water separator (4) on mounting.
(5)Install straps, screws (5) and (12).
Do not tighten at this stage.
(6)Make certain that o-rings (2) and (10) are correctly installed ; install clamps (3) and (11) and tighten nuts. TORQUE to the value given on clamps.
(7)Tighten screws (5) and (12). TORQUE to between 0.28 and 0.38 m.daN (25 and 35 lbf.in.).
(8)Connect drain line (8) and tighten nut (7).

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/
R PANELS AT FR47.
(2)Install access door 147BZ.
(3)Close main gear door (Ref. 32-12-11, P. Block 301).
(4)Remove access platform.
(5)Remove warning notices.

REFRIGERATION UNIT PACK - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A. 98A21001500000	Installation/Positioning Tool - Refrigeration Unit Pack
B.	Access Platform 2.60 m (8 ft. 6 in.)
C.	Blanking Plugs/Caps
D.	Torque Wrench 0.80 m. daN (71 lbf. in.)
E.	Warning Notices
F.	Lockwire Dia. 0.8 mm (0.030 in.)
G.	Lockwashers
H.	O-Rings
J. Material No. 04-007	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 21-51-00, P. Block 501	Air Cooling System
- 21-51-32, P. Block 401	Heat Exchanger
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

2. Procedure

(Ref. Fig. 401)
(Ref. Fig. 402)

A. Job Set-Up

(1)Display warning notices prohibiting pressurization of pneumatic system.
(2)Open main gear doors (Ref. 32-12-11, P. Block 301).
(3)Position access platform.
(4)Remove air conditioning compartment access doors 147BZ, 147CZ, (148CZ).
(5)Remove heat exchanger (Ref. 21-51-32, P. Block 401).
(6)Position installation/positioning tool as follows : (Ref. Fig. 401)
(a)Position tool with lockplates retracted and latches not protruding.
(b)Position tool in fuselage opening between FR44 and FR46 with stops (3) bearing against front edge of opening.
NOTE : Tool is positioned in place of heat exchanger and bears against heat exchanger/pack ram air plenum contact surface.
(c)Secure fixture (6) onto opening frame by means of mechanism (2).
(d)Make certain that latches (4) are correctly engaged in fuselage opening frame and secure mechanism (2) using lever (5).
(e)Push the two front lockplates (1) upwards into pack ram air plenum (10).
(f)Rotate latch (8) 90° and lock.
(g)Tighten knurled screws (7) to lock the two fittings (9) and make certain that pack ram air plenum is correctly positioned on tool.

B. Removal

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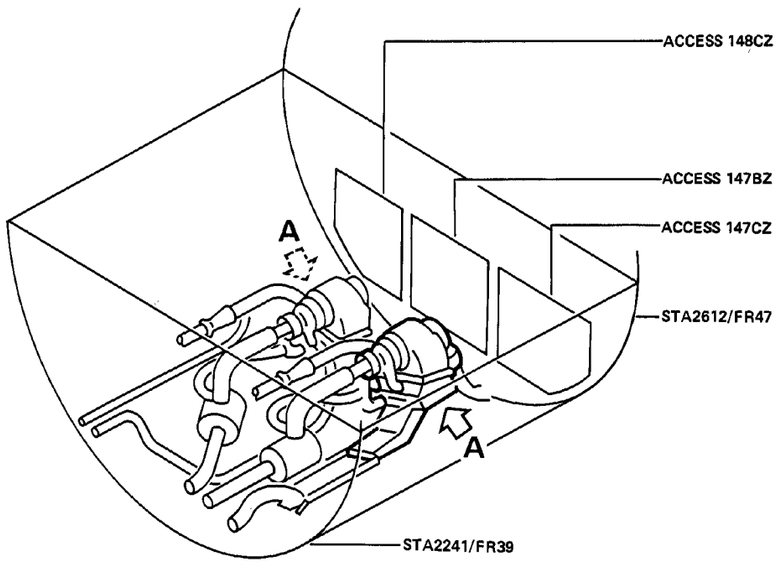

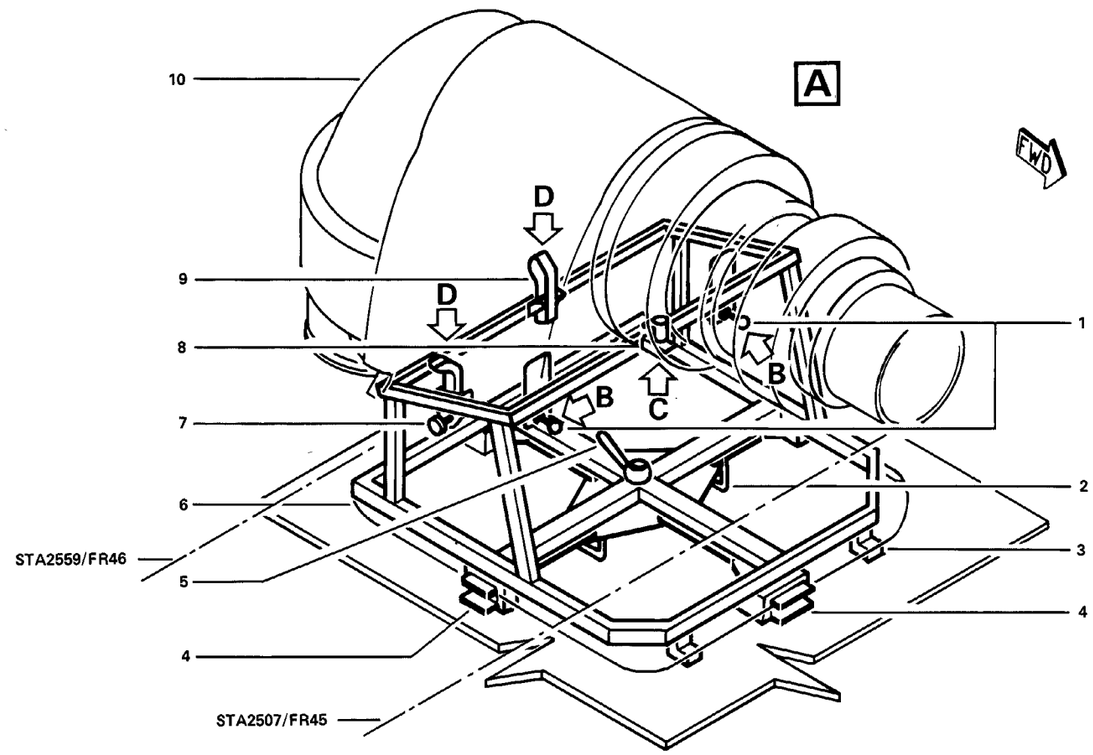

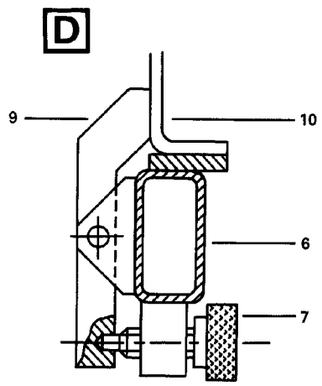

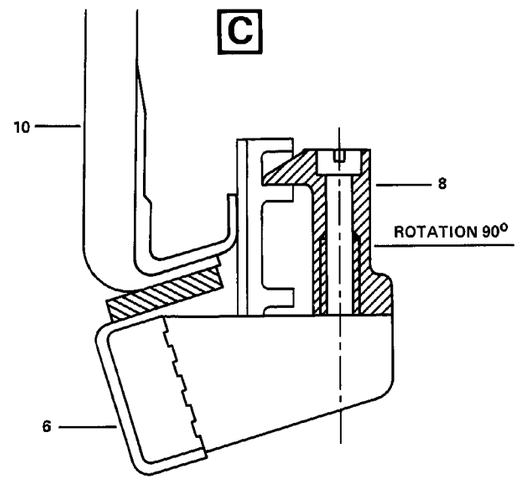

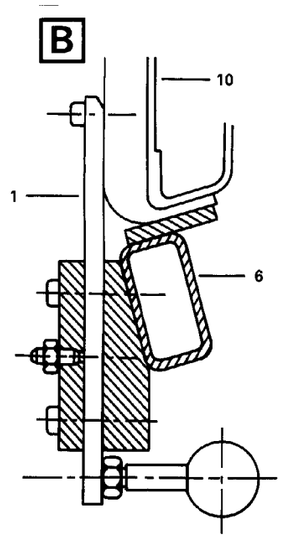

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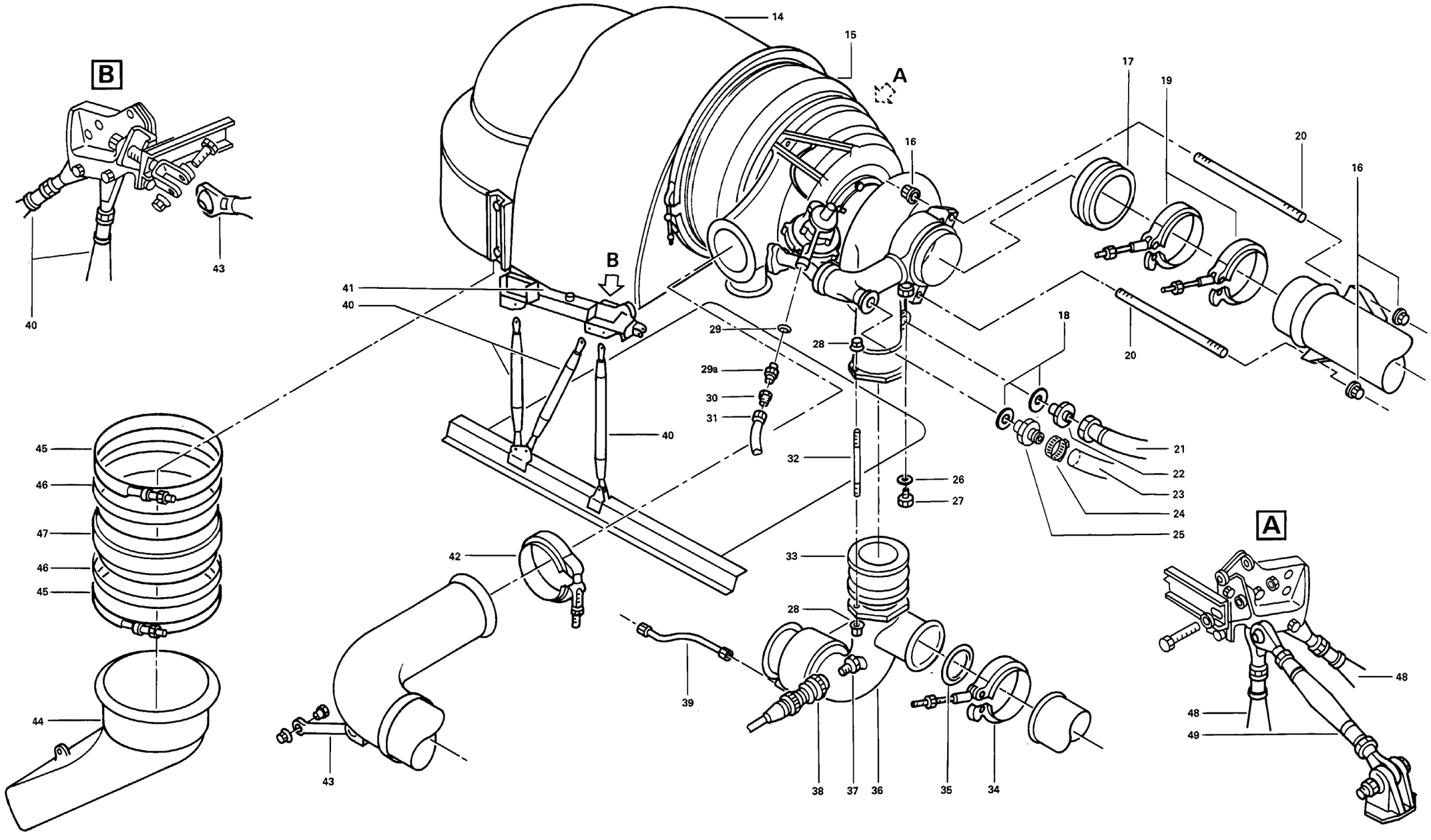
Installation/Positioning Tool - Refrigeration Unit Pack
Figure 401



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Refrigeration Unit Pack
Figure 402

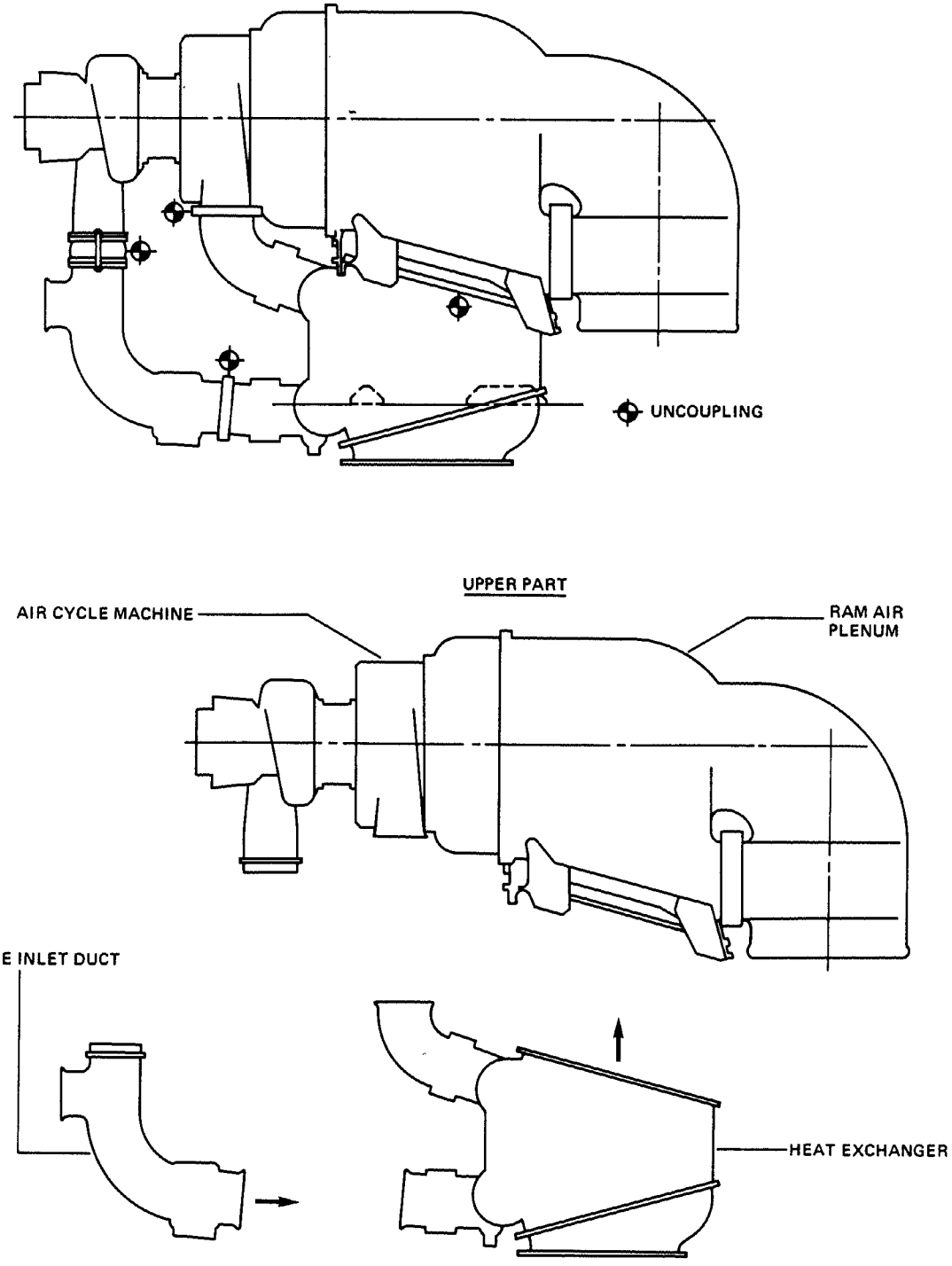
(Ref. Fig. 402)

WARNING : TO DISCONNECT SENSE LINES OR TO REMOVE UNIONS ON REFRIGERATION UNIT PACK, USE A BACK-UP WRENCH ON WRENCH PADS PROVIDED ON OUTLET PORTS TO PREVENT POSSIBLE DAMAGE TO PORTS AND TO ELBOW SECTION OF REFRIGERATION UNIT PACK.

(1) Remove the two clamps (45), the two protective bands (46) and slide flexible sleeve (47) onto cooling air outlet duct (44) to free cooling air outlet connection.
(2) Disconnect electrical connector (38) from turbine inlet temperature sensor (37).
(3) Disconnect thermal protection vent port sense line (21).
(4) Remove clamp (24) and disconnect water separator anti ice hose (23).
(5) Disconnect anti ice valve sense line (31).
(6) Disconnect drain hose (39) from lower port of turbine inlet duct (36).
(7) At turbine air outlet, remove nuts (16), studs (20) and clamps (19). Slide flexible sleeve (17) to free turbine air outlet duct.
(8) Remove clamp (42) from pack inlet connection.
(9) Remove clamp (34) from turbine bypass connection ; discard O-ring (35).
(10) Remove nuts (28) and studs (32) from turbine inlet connection. Remove turbine inlet duct (36) and coupling (33).
(11) Disconnect cooling air inlet duct securing rod (43) on refrigeration unit pack side.
(12) Disconnect the three securing rods (40), two vertical and one diagonal, on the right side of pack.
(13) Disconnect the three securing rods (48), two vertical and one diagonal, on the left side of pack.
(14) Disconnect side rod (49) at its attachment on pack only.
(15) On tool, loosen the two fittings (9) using knurled screws (7) ; unlock latch (8) and pull the two front lockplates (1) downwards.
(Ref. Fig. 401)
(16) Lift pack (upper part : ram air plenum (14) and air cycle machine (15)) clear of tool making certain not to damage any adjacent components in air conditioning compartment (weight is 40 kg (88 lb) approx.).
(17) Lower pack upper part down to the ground through hydraulics compartment and main gear door opening.
NOTE : Refer to Preparation of Replacement Component paragraph for components to be retained.
(18) Cap open ends of ducts, pipes and sense lines which have been disconnected.

C. Preparation of Replacement Component

(1) Depreserve pack and separate into three parts : upper part (ram air plenum and air cycle machine), heat exchanger (Ref. 21-51-32, P. Block 401) and turbine inlet duct.
NOTE : Retain attaching and connecting parts to be used for installation of these components.
(Ref. Fig. 403)
(2) Install securing belt (8) retained from removed pack on replacement pack as follows :
(Ref. Fig. 404)
(a) Mark location of peel shims (2) located between ram air plenum forward



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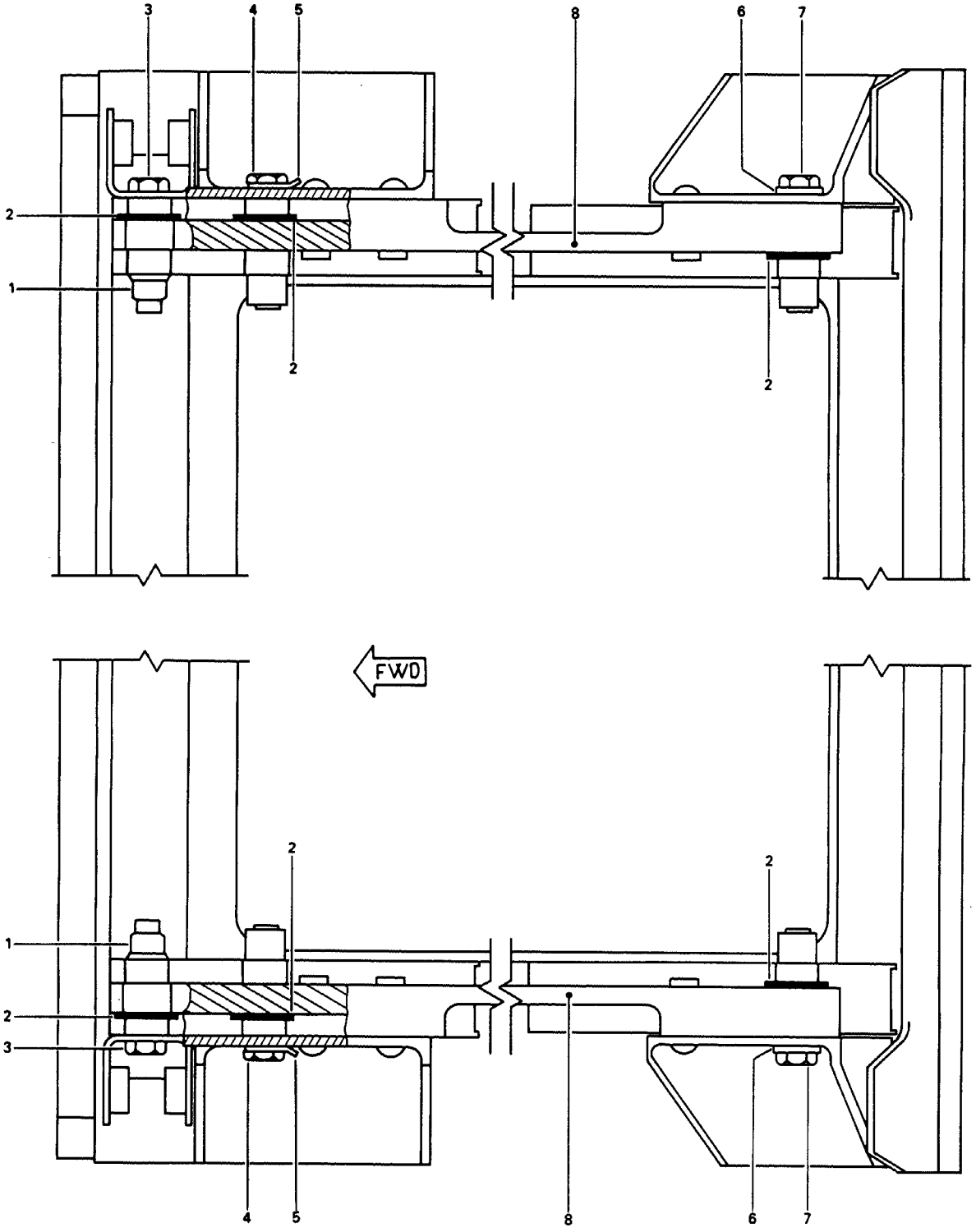
Refrigeration Unit Pack Configuration
Before Installation on Aircraft
Figure 403



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Pack Securing Belt-Installation
Figure 404

and aft attachment brackets and securing belt (8) fittings.

(b)Adjust securing belt (8) on pack ram air plenum and insert peel shims between pack ram air plenum forward and aft attachment brackets and securing belt (8) fittings.

NOTE : Increase or decrease peel shim thickness as necessary to adjust securing belt.

(c)Install securing belt (8) attaching bolts :

- two bolts (3) with nuts (1) and two bolts (4) with lockwashers (5) at the front
- two bolts (7) and washers (6) at the back.

NOTE : Make certain that peel shims (2) are correctly installed.

(d)Tighten bolts (3), (4) and (7) ; wirelock the aft bolts (7) and fold back tabs of lockwashers (5) of front bolts (4).

(3)Clean restrictor (30) and unions (29a), (22) and (25) retained from removed refrigeration unit pack and check for correct condition ; replace O-rings (18) and (29) and install on replacement pack. Coat union threads with grease (Material No. 04-007.)
(Ref. Fig. 402)

WARNING : TO INSTALL UNIONS AND TO CONNECT SENSE LINES ON REFRIGERATION UNIT PACK, USE A BACK-UP WRENCH ON WRENCH PADS PROVIDED ON OUTLET PORTS TO PREVENT POSSIBLE DAMAGE TO PORTS AND TO ELBOW SECTION OF REFRIGERATION UNIT PACK.

(4)Clean turbine outlet drain plug (27) retained from removed refrigeration unit pack and check for correct condition ; replace O-ring (26) and install on replacement pack. Coat plug threads with grease (Material No. 04-007).

D. Installation

NOTE : If refrigeration unit pack installation/positionning tool has been removed refer to paragraph 2.A. Job set-up for tool installation.

(1)Clean and inspect refrigeration unit pack interface and/or adjacent area.

(2)Remove blanking plugs/caps and check for correct condition of pipe and sense line end fittings, duct flanges, cooling air inlet and outlet ducts.

(3)Position pack upper part (ram air plenum (14) and air cycle machine (15)) at main gear door opening and hoist onto hydraulics compartment floor.

(4)Make certain that flexible sleeves (47) and (17) are installed on cooling air outlet duct (44) and turbine air outlet duct.

(5)Position pack upper part on installation/positioning tool installed in fuselage opening between FR44 and FR46. Make certain that ram air plenum (14) is correctly positioned on tool and ducts correctly aligned with pack connections.

(6)Install flexible sleeve (17) on turbine air outlet connection.

(7)Install flexible sleeve (47) on cooling air outlet connection.

(8)Install pack upper part on installation/positioning tool as follows :
(Ref. Fig. 401)

(a)Push the two front lockplates (1) upwards into pack ram air plenum (10).

(b)Rotate latch (8) 90° and lock.

(c)Tighten the two fittings (9) using knurled screws (7) and make certain that pack ram air plenum is correctly installed on tool.

(9)Connect the six rods (40) and (48) securing refrigeration unit pack to structure. Adjust rods if necessary.
(10)Connect side rod (49). Adjust if necessary.
(11)Connect rod (43) securing cooling air inlet duct pack side. Align duct with pack connection ; adjust rod if necessary.
NOTE : When rods are adjusted, make certain that thread is visible through inspection holes. Tighten and wirelock locknuts.
(12)Install O-ring (35) in groove provided in turbine bypass duct.
(13)Install coupling (33) on turbine inlet duct (36).
(14)Install turbine inlet duct (36), making certain that coupling (33) is correctly installed on turbine inlet duct and that O-ring (35) is correctly installed in duct flange.
(15)Install studs (32) and nuts (28) ; tighten nuts until end play of studs is at a minimum which will allow finger rotation of studs.
CAUTION : DO NOT OVERTIGHT NUTS (28). FINGER ROTATION OF STUDS (32) SHOULD BE ALLOWED.
(16)Install clamp (34) securing turbine bypass connection. Tighten nut ; TORQUE to the value given on clamp.
(17)Install clamp (42) on pack air inlet connection. Tighten nut ; TORQUE to the value given on clamp.
(18)Make certain that flexible sleeve (17) is correctly installed on turbine outlet connection ; install clamps (19). Tighten nuts ; TORQUE to the value given on clamps.
(19)Install studs (20) ; tighten nuts (16) until end play of studs is at a minimum which will allow finger rotation of studs.
(20)Connect sense line (31) to pack anti ice valve.
(21)Connect water separator anti ice hose (23) ; install and tighten clamp (24).
(22)Connect thermal protection vent port sense line (21).
(23)Connect electrical connector (38) to turbine inlet temperature sensor (37).
(24)Connect drain hose (39) to lower port of turbine inlet duct (36).
(25)Make certain that flexible sleeve (47) is correctly installed on cooling air outlet connection ; install the two protective bands (46) ; install and tighten the two clamps (45).
(26)Remove installation/positioning tool as follows : (Ref. Fig. 401)
(a)Loosen knurled screws (7) to release the two fittings (9).
(b)Rotate latch (8) 90 ° to unlock.
(c)Pull the two front lockplates (1) downwards.
(d)Release lever (5), unlock locking mechanism (2) to free latches (4) from frame of opening in fuselage. Remove tool.
(27)Install heat exchanger (Ref. 21-51-32, P. Block 401).

E. Test
Perform operational test of air cooling system (Ref. 21-51-00, P. Block 501).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY

R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/
R PANELS AT FR47.

(2)Install access doors 147BZ, 147CZ (148CZ).
(3)Close main gear doors (Ref. 32-12-11, P. Block 301).
(4)Remove access platform.
(5)Remove warning notices.

R COOLING TURBINE - REMOVAL/INSTALLATION

R WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.6 m (8 ft. 6 in.)
B.	Blanking Plugs/Caps
C.	O-Rings
D.	Warning Notices
E.	Torque Wrench 0.95 m.daN (84 lbf.in.)
F. Material No. 04-007	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 21-51-00, P. Block 501	Air Cooling System
R	
- 21-51-36, P. Block 401	Heat Exchanger Inlet Connector
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

2. Procedure

A. Job Set-Up

(1)On COMPT TEMP panel 437VU
- make certain that PACK VALVE 1 and 2 pushbutton switches are released (out).

(2)Display warning notices prohibiting pressurization of pneumatic system.
(3)Open main gear door (Ref. 32-12-11, P. Block 301).
(4)Position access platform.
(5)Remove air conditioning compartment access door 147BZ.

B. Removal

(Ref. Fig. 401)

WARNING : TO DISCONNECT LINES OR TO REMOVE UNIONS ON COOLING TURBINE, USE A BACK-UP WRENCH ON WRENCH PADS PROVIDED ON OUTLET PORTS TO PREVENT POSSIBLE DAMAGE TO PORTS AND TO ELBOW SECTION OF COOLING TURBINE.

(1)Disconnect hose (18) from anti ice valve.
(2)Remove clamp (14) and disconnect water separator anti ice hose (13).
(3)Disconnect thermal protection vent port sense line (15).
(4)At turbine air outlet, remove nuts (3), studs (6) and clamps (5).
(5)Remove clamp (9).
(6)Remove nut (8), bolt (12) and bonding strips (11).
(7)Remove clamp (10) and duct (7).
(8)Remove clamps (16), (19) and (20) from compressor inlet, outlet and bypass connectors.
NOTE : Operations (9), (10), (11) and (12) are valid for pack No. 1 only.
(9)Remove nuts (32), bolts (33) and disengage rods (34) and (35).
(10)Remove nut (31), bolt (29) and disconnect bonding strip (24).

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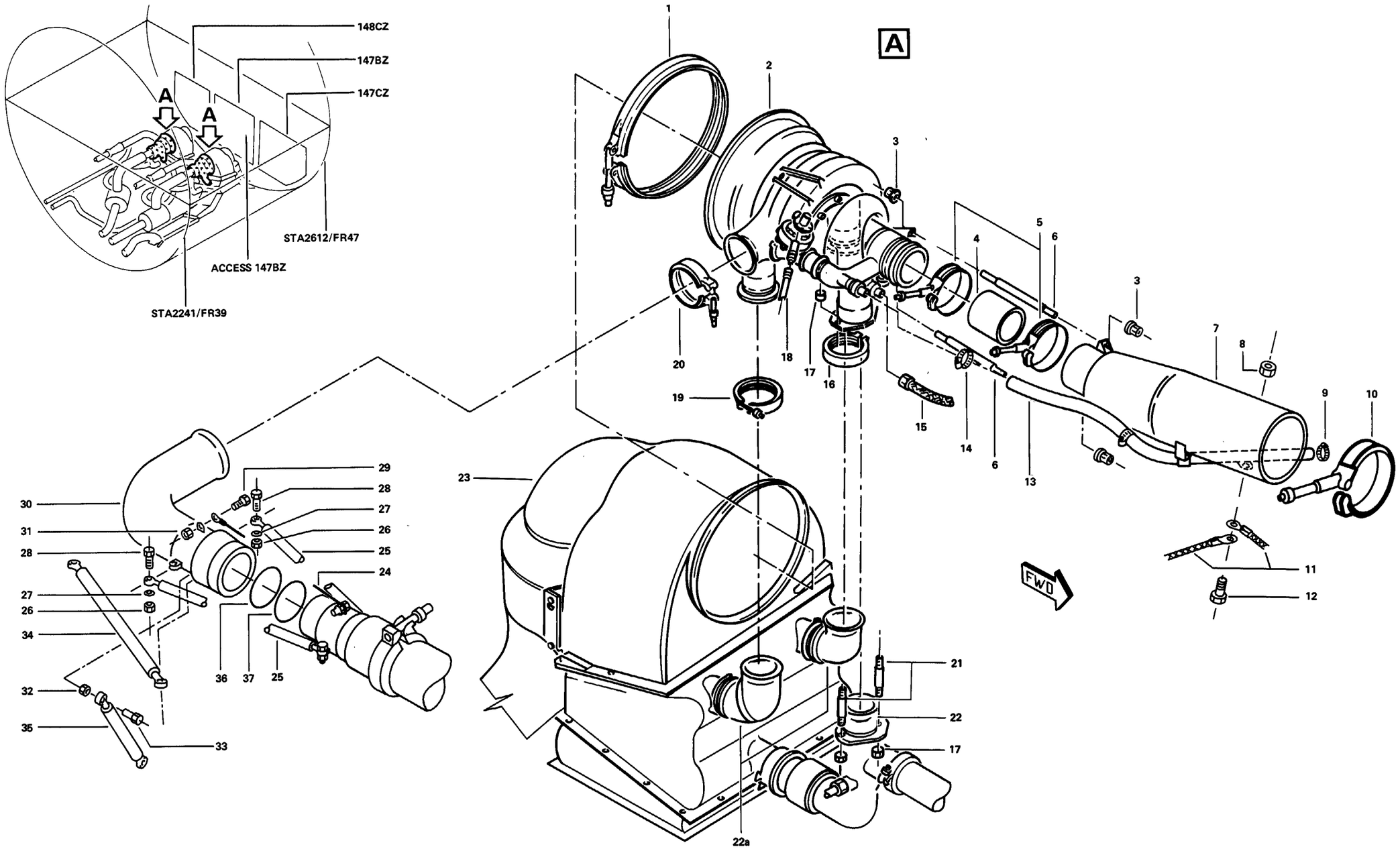

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Air Cycle Machine
Figure 401

R

(11)Remove nuts (26), washers (27), bolts (28) and disengage rods (25).
(12)Remove duct (30) and seals (36) and (37).
(13)Remove nuts (17) and studs (21) from turbine inlet connector. Retain coupling (22), which shall be used to install replacement cooling turbine.
(14)Remove clamp (1) between ram air plenum (23) and air cycle machine (2).
(15)Remove air cycle machine (2) (weight is 25 kg (55 lb.) approx.) through hydraulics compartment and main gear door opening ; lower air cycle machine (2) down to ground.
(16)Cap open ends of ducts and hoses.

C. Preparation of Replacement Component

R (Ref. Fig. 402)

WARNING : TO INSTALL UNIONS AND TO CONNECT LINES ON COOLING TURBINE USE A BACK-UP WRENCH ON WRENCH PADS PROVIDED ON OUTLET PORTS TO PREVENT POSSIBLE DAMAGE TO PORTS AND TO ELBOW SECTION OF COOLING TURBINE.

(1)Clean and check for correct condition of unions (48), (50) and drain end fitting (46) retained from removed air cycle machine ; install on replacement air cycle machine with new O-rings (45), (47) and (49). Coat threads of unions and end fitting with grease (Material No. 04-007).

R

R D. Installation (Ref. Fig. 401,)

(1)Remove blanking plugs/caps and check for correct condition of duct ends and flanges.
(2)Clean and inspect cooling turbine interface and/or adjacent area.
(3)Make certain that the face of the heat exchanger is free from debris.
(4)Make certain that coupling (22) is correctly installed on turbine inlet duct.
(5)Install air cycle machine (2) on ram air plenum (23).
(6)Align index notches on air cycle machine (2) with those on ram air plenum (23).
(7)Install clamp (1) ; check that opening side is correctly located.
(8)Make certain that ducts are correctly oriented and aligned with air cycle machine (2) connectors.

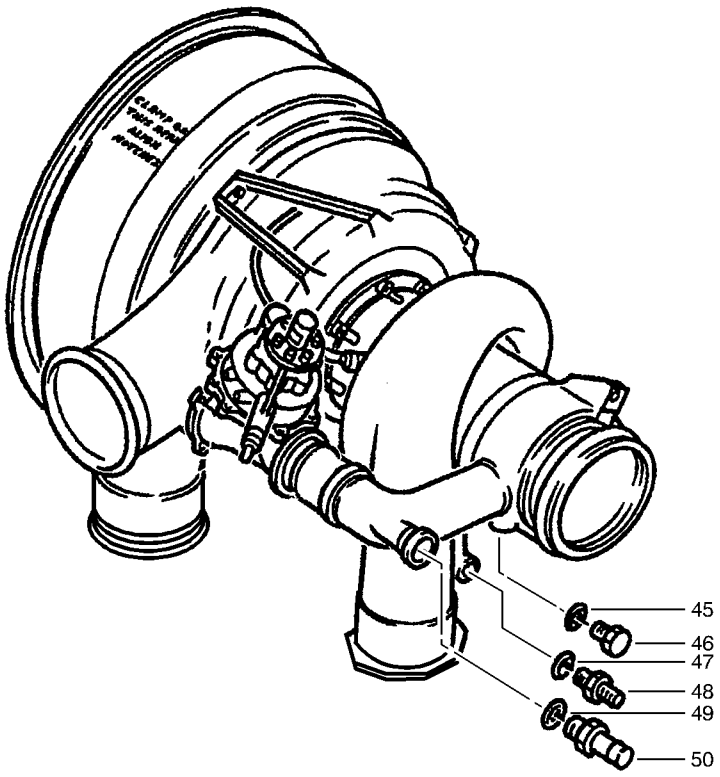
NOTE : In case of loosening one or more clamps on heat exchanger inlet connectors (22a), to improve duct alignment, it is recommended to remove and replace sleeve(s) (Ref. 21-51-36, P. Block 401).

(9)Tighten nut of clamp (1) ; TORQUE to value given on clamp.
(10)Install studs (21) and nuts (17) ; tighten nuts until end play of studs (21) is at a minimum which will allow finger rotation of studs.

CAUTION : DO NOT OVERTIGHT NUTS (17). FINGER ROTATION OF STUDS (21) SHOULD BE ALLOWED.

NOTE : Operations (11), (12), (13) and (14) are valid for pack No. 1 only.

(11)Install seals (36) and (37), and install duct (30).
(12)Install rods (25), bolts (28), washers (27) and nuts (26) and tighten nuts.
(13)Install bonding strip (24). Install bolt (29) and nut (31) ; tighten nut.
(14)Install rods (34) and (35). Install nuts (33) and bolts (32) ; tighten



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R

Cooling Turbine
Figure 402

nuts.
(15)Install clamps (16), (19) and (20) on compressor inlet, outlet and bypass connectors. Tighten nuts ; TORQUE to the value given on clamps.
(16)Install duct (7) and clamp (10) ; TORQUE to the value given on clamp.
(17)Install bonding strips (11), bolt (12) and nut (8) ; tighten nut.
(18)Install clamp (9).
(19)Install flexible sleeve (4) and clamps (5). Tighten nuts ; TORQUE to the value given on clamps.
(20)Install studs (6) and nuts (3) ; tighten nuts until end play of studs (6) is at a minimum which will allow finger rotation of studs.
(21)Connect sense line (15).
(22)Install clamp (14) and connect hose (13).
(23)Connect hose (18) to anti ice valve.

E. Test
Carry out an operational test of air cooling system (Ref. 21-51-00, P. Block 501).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/ PANELS AT FR47.
(2)Install access door 147BZ.
(3)Close main gear door (Ref. 32-12-11, P. Block 301).
(4)Remove access platform.
(5)Remove warning notices.

ANTI ICE VALVE - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE AIR CONDITIONING SYSTEM MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	O-Rings
B.	Warning Notices
C.	Blanking Plugs/Caps
Referenced Procedure - 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

R (Ref. Fig. 401)

A. Job Set-Up

(1) On COMPT TEMP Panel 437VU
- make certain that PACK VALVE 1 and 2 pushbutton switches are released (out).

(2) Display warning notices prohibiting pressurization of pneumatic system.

(3) Open main landing gear door (Ref. 32-12-11, P. Block 301).

(4) Remove air conditioning compartment access door 147BZ.

B. Removal

R (1) Disconnect sense line (9).

R (2) Open and remove circlip (6) from its housing.

R (3) Slide coupling (4) on valve outlet connector in order to free valve.

R (4) Remove the four nuts (13) and washers (12) and the four bolts (7) and washers (8).

R (5) Remove anti ice valve (10) from air cycle machine. Remove and discard O-rings (3), (5) and (11).

R (6) Cap open ends of air cycle machine ducts and sense line.

C. Preparation of Replacement Component

R (1) Clean and inspect union (2) and restrictor (2a) retained from removed valve and install on replacement component. Replace O-ring (1).

D. Installation

(1) Clean and inspect anti ice valve interface and/or adjacent area.

(2) Remove blanking plugs caps.

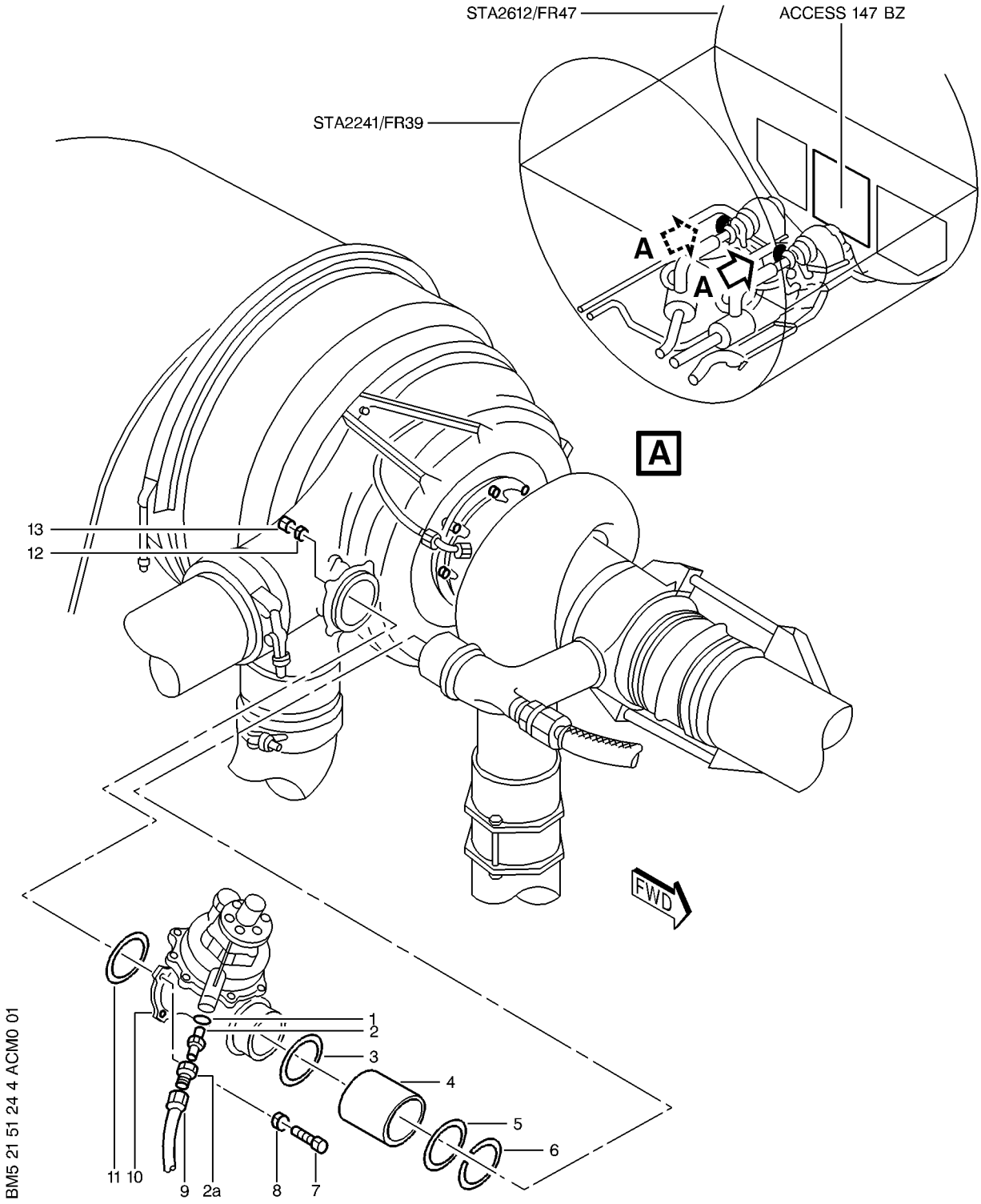
R (3) Install new O-rings (3), (5) and (11).

R (4) Install anti ice valve (10) on air cycle machine.

R (5) Install washers (8) and bolts (7); washers (12) and nuts (13) and tighten.

R (6) Install coupling (4) on anti ice valve and circlip (6) in its housing.

R (7) Connect sense line (9) to anti ice valve.



Anti Ice Valve
Figure 401

R

E. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/
R PANELS AT FR47.

(2)Install access door 147BZ.

(3)Close main landing gear door (Ref. 32-12-11, P. Block 301).

(4)Remove warning notices.

R COMPRESSOR BYPASS CHECK VALVE - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

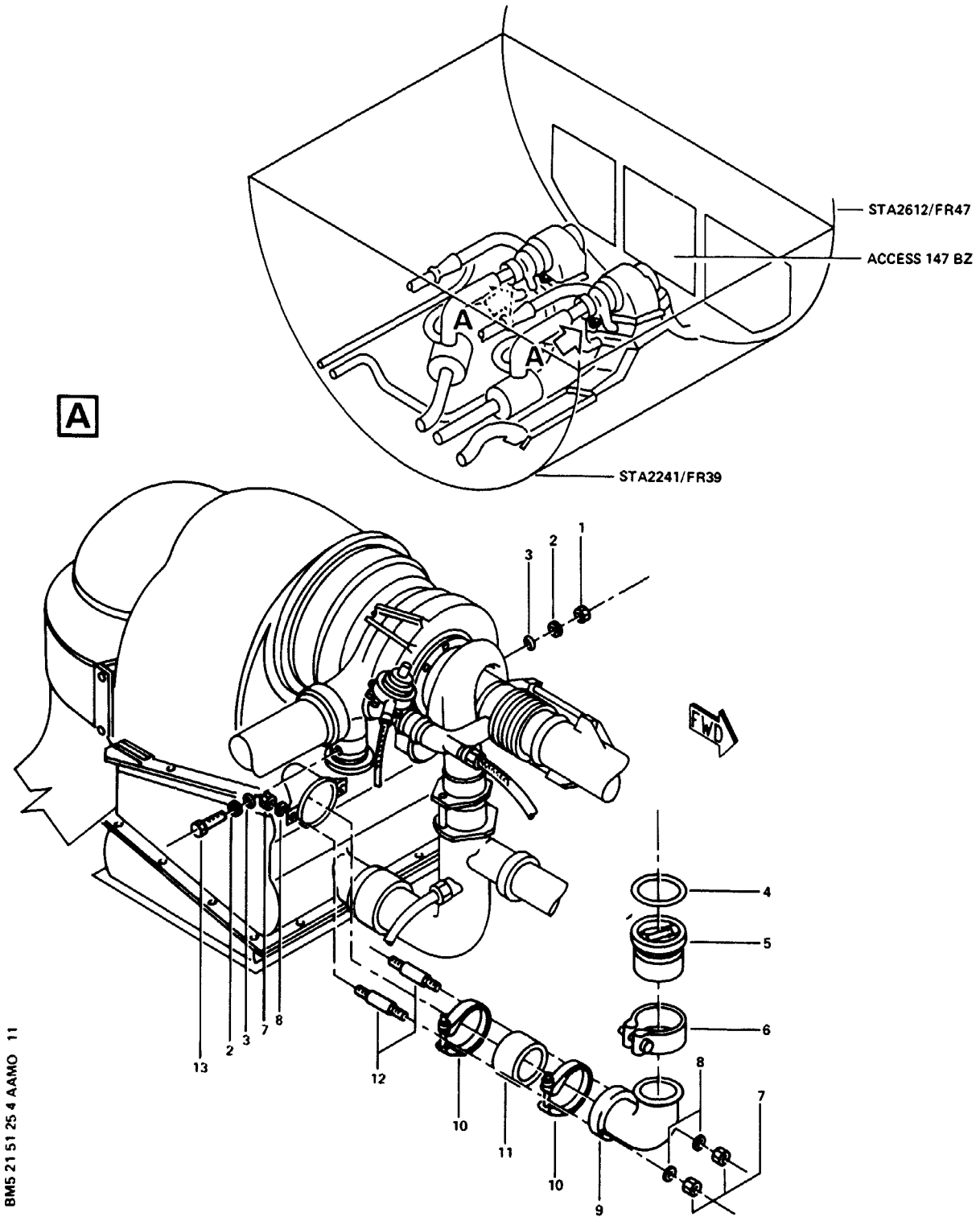
ITEM	DESIGNATION
A.	Torque Wrench 0 to 0.90 m. daN (0 to 80 lbf. in.)
B.	Warning Notices
C.	O-Ring
D.	Blanking Plugs/Caps
E. 2215569-2 or 2215569-3 or 2215569-4	Sleeve
F. 2214842-3	Clamp
G.	Gripper Band
Referenced Procedures	
- 21-51-00, P. Block 501	Air Cooling System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)On COMPT TEMP panel 437VU
(a)Make certain that PACK VALVE 1 and 2 pushbutton switches are released (out).
(2)Display warning notices prohibiting pressurization of pneumatic system.
(3)Open main gear door (Ref. 32-12-11, P. Block 301).
(4)Remove air conditioning compartment access door 147BZ.

B. Removal
(1)Remove clamp (6).
(2)Remove nuts (7), washers (8) and studs (12) from heat exchanger inlet connection.
(3)Cut and remove lockwire (if installed), and remove clamps (10).
(4)Remove and discard sleeve (11).
(5)Remove elbow duct (9).
(6)Remove nut (1), washers (2), seals (3) and bolt (13).
(7)Remove check valve (5) and discard O-ring (4).
(8)Cap all open ends of disconnected ducts.

C. Installation
(1)Remove blanking caps.
(2)Clean and inspect check valve interface and/or adjacent area.
(3)Install a new O-ring (4) on check valve (5).
(4)Install check valve (5) on compressor bypass duct. Install bolt (13), seals (3), washers (2) and nut (1).



Compressor Bypass Check Valve
Figure 401

(5)Install elbow duct (9) and a new sleeve (11).
NOTE 1 : Do not use sealant material for the installation of the sleeve (11).
NOTE 2 : If you install a sleeve (11) that has three black stripes (sleeve P/N 2215569-2 or P/N 2215569-3 or P/N 2215569-4), you must install it with hinged clamps (10) with gripper band (clamp P/N 2214842-3). With this type of sleeve and clamp, you must not do the retorque procedure given in step (11).
(6)Install clamp (6). Do not tighten at this stage.
(7)Make certain that assembly is correctly aligned. TORQUE clamp (6) to the value given on the clamp.
(8)Install hinged clamps (10) and TORQUE to the value given on the clamp. (Do not install studs (12) and do not wirelock clamp nuts at this stage).
(9)Perform operational test of air cooling system (Ref. 21-51-00, P. Block 501).
NOTE : If the time of the test is less than twenty minutes, let the pack run in AUTO mode to reach a total running time of twenty minutes minimum.
(10)Let heat exchanger cool down for at least five minutes after packs are shut down.
(11)Make certain that sleeve (11) is correctly installed. TORQUE again clamps (10) to between 0.38 and 0.42 m.daN (33 and 37 lbf.in.). Wirelock clamp nuts.
(12)Install studs (12), washers (8) and nuts (7). Tighten nuts (7) until end play of studs is at a minimum which will allow finger rotation of studs.

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/ PANELS AT FR47.
(2)Install access door 147BZ.
(3)Close main gear door (Ref. 32-12-11, P. Block 301).
(4)Remove warning notices.

COMPRESSOR DISCHARGE OVERTEMPERATURE FUSIBLE PLUG - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Lockwire Dia. 0.5 mm (0.020 in.)
B.	Blanking Plug/Cap
C.	Seal
D.	Warning Notices
E.	Torque Wrench 4 to 4.7 m.daN (350 to 420 lbf. in.)
F. Material No. 04-007	Common Greases (Ref. 20-31-00)
Referenced Procedure - 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)

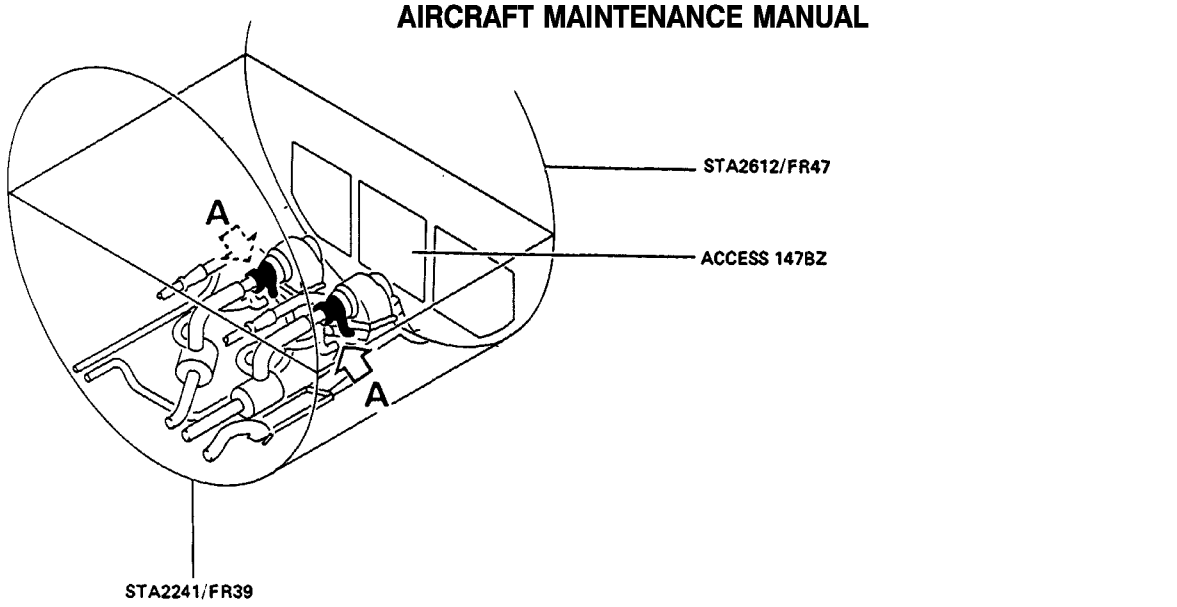
2. Procedure
(Ref. Fig. 401)

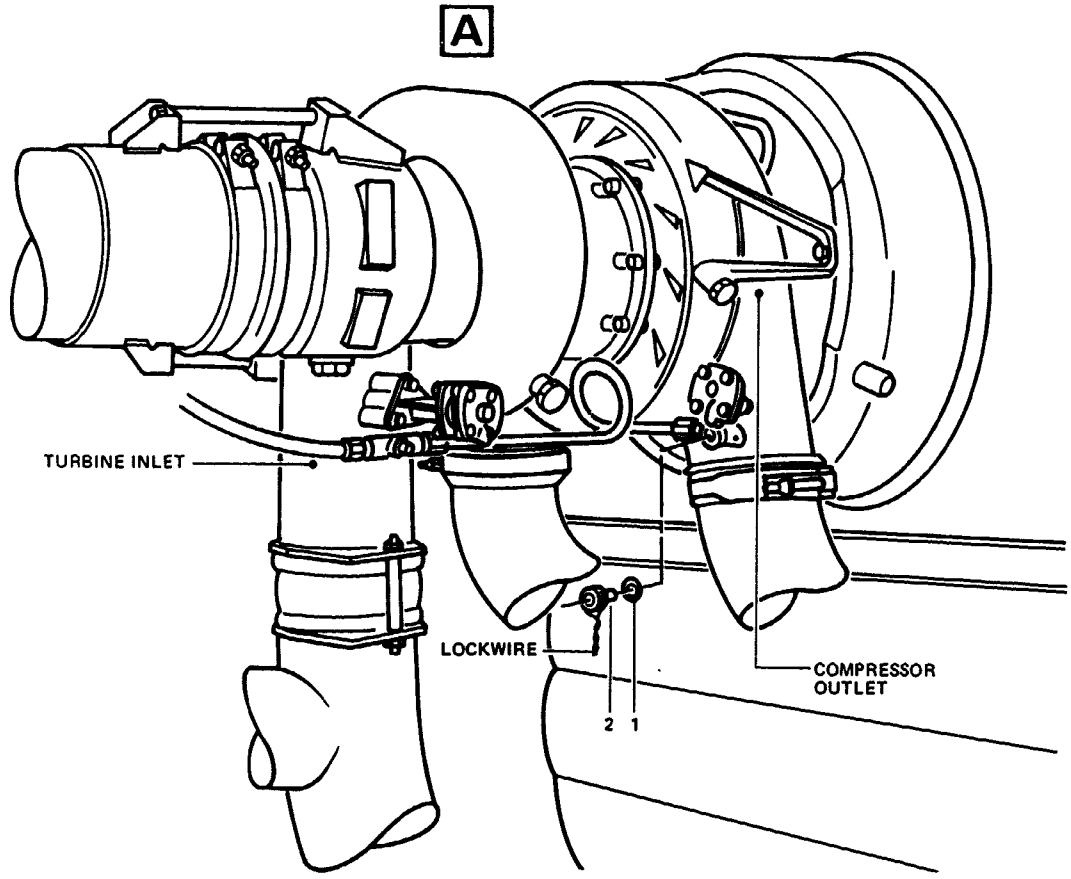
A. Job Set-Up
(1)Display warning notices prohibiting pressurization of pneumatic system.
(2)Open main landing gear door (Ref. 32-12-11, P. Block 301).
(3)Remove air conditioning compartment access door 147BZ.

B. Removal
(1)Cut and remove lockwire ; remove fusible plug (2) and discard seal (1).
(2)Blank off the fusible plug orifice on duct.

C. Installation
(1)Remove blanking plug.
(2)Clean and inspect fusible plug interface and/or adjacent area.
(3)Apply Material No. 04-007 (Ref. 20-31-00) to fusible plug threads.
(4)Install new seal (1) on fusible plug (2).
(5)Install fusible plug on compressor discharge duct. Tighten fusible plug and TORQUE to between 4 and 4.7 m.daN (350 and 420 lbf.in.). Wirelock.

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/
R PANELS AT FR47.
(2)Install access door 147BZ.
(3)Close main landing gear door (Ref. 32-12-11, P. Block 301).
(4)Remove warning notices.





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Compressor Discharge Overtemperature Fusible Plug
Figure 401

TURBINE INLET OVERTEMPERATURE FUSIBLE PLUG - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED

1. Equipment and Materials

ITEM	DESIGNATION
A.	Lockwire Dia. 0.5 mm (0.020 in.)
B.	Blanking Plug/Cap
C.	O-Rings
D.	Warning Notices
E. Material No. 04-007	Common Greases (Ref. 20-31-00)
Referenced Procedure - 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

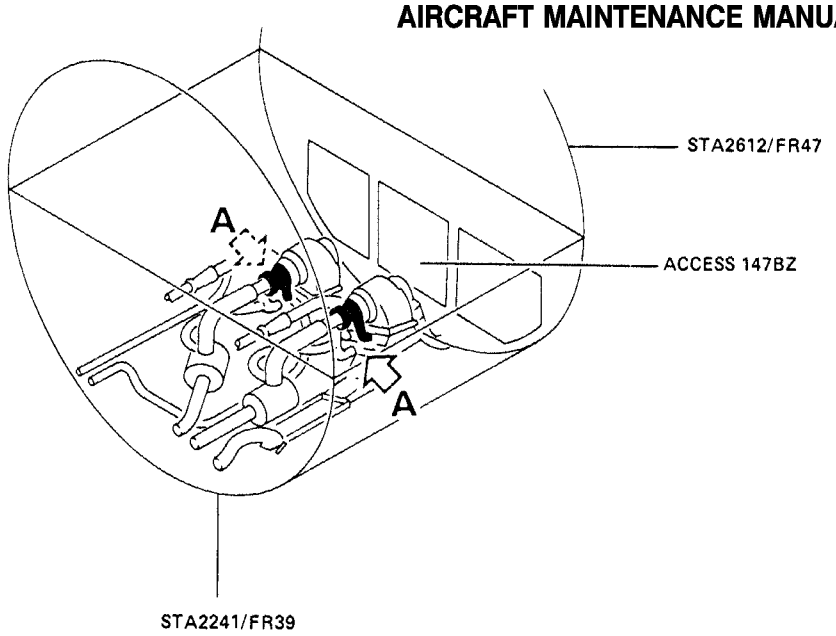
2. Procedure
(Ref. Fig. 401)

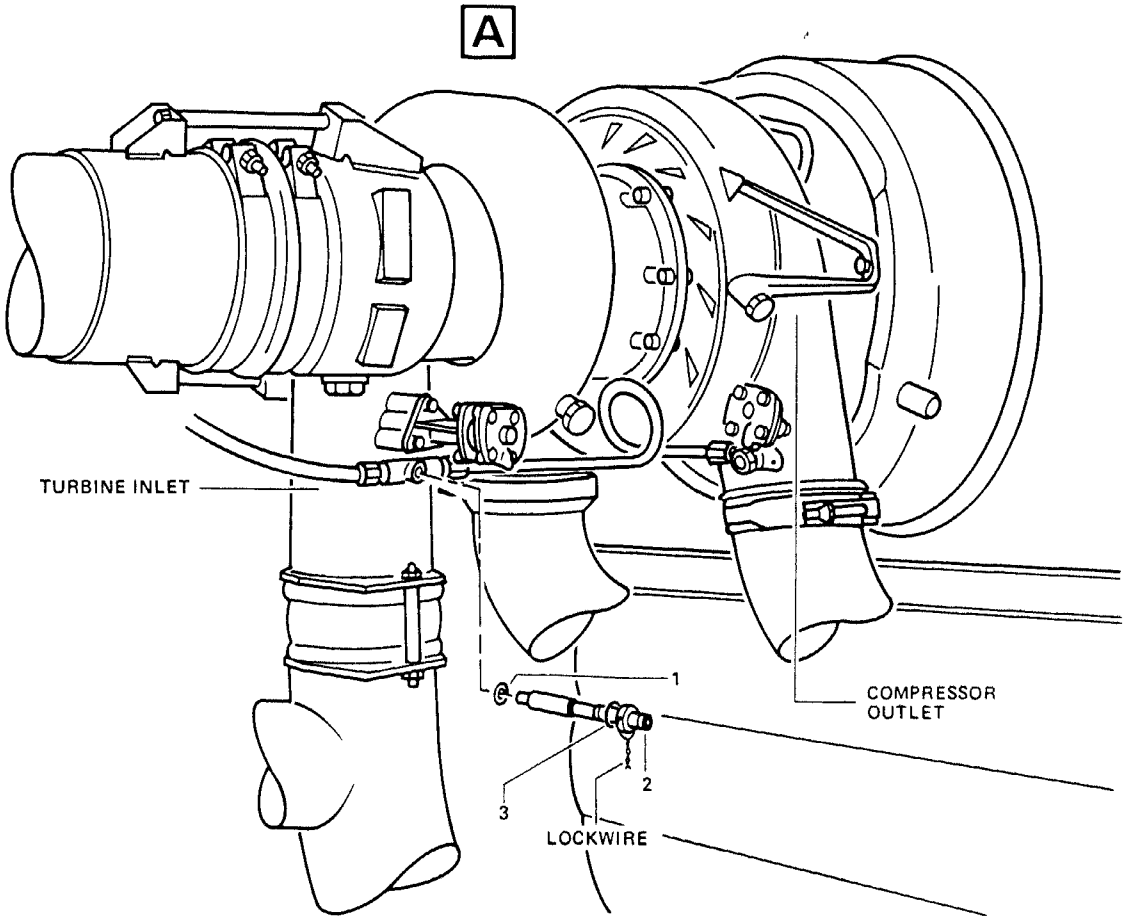
A. Job Set-Up
(1)Display warning notices prohibiting pressurization of pneumatic system.
(2)Open main landing gear door (Ref. 32-12-11, P. Block 301).
(3)Remove air conditioning compartment access door 147BZ.

B. Removal
(1)Cut and remove lockwire ; remove fusible plug (2) and discard O-rings (1) and (3).
(2)Blank off fusible plug orifice on duct.

C. Installation
(1)Remove blanking plug.
(2)Clean and inspect fusible plug interface and/or adjacent area.
(3)Apply Material No. 04-007 (Ref. 20-31-00) to fusible plug threads.
(4)Install new O-rings (1) and (3) on fusible plug (2).
(5)Install fusible plug on turbine inlet duct. Tighten fusible plug and wirelock.

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/
R PANELS AT FR47.
(2)Install access door 147BZ.
(3)Close main landing gear door (Ref. 32-12-11, P. Block 301).
(4)Remove warning notices.





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Turbine Inlet Overtemperature Fusible Plug
Figure 401

COMPRESSOR DISCHARGE PNEUMATIC THERMOSTAT - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plug/Cap
B.	Warning Notice
Referenced Procedure - 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

A. Job Set-Up
(1)On COMPT TEMP panel 437VU
- make certain that PACK VALVE 1 and 2 pushbutton switches are released (out).

(2)Display warning notices prohibiting pressurization of pneumatic system.
(3)Open main gear door (Ref. 32-12-11, P. Block 301).
(4)Remove air conditioning compartment access door 147BZ.

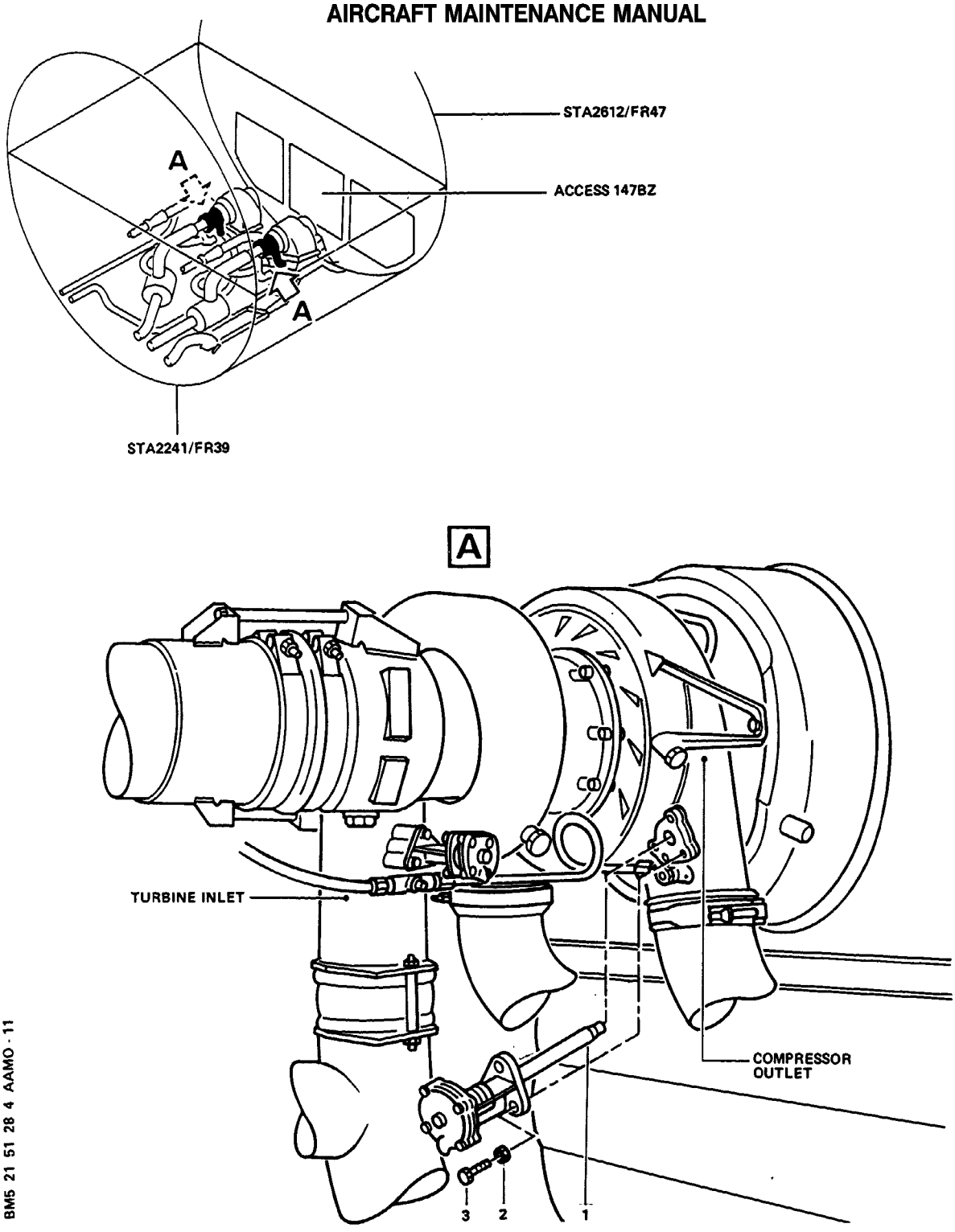
B. Removal
(Ref. Fig. 401)
(1)Remove the three screws (3) and washers (2).
(2)Remove thermostat (1) from compressor discharge duct.
(3)Blank off thermostat orifice on compressor discharge duct.

C. Installation
(1)Remove blanking plug/cap.
(2)Clean and inspect thermostat at interface and/or adjacent area.
(3)Install thermostat (1) on compressor discharge duct.
(4)Install washers (2) and screws (3). Tighten screws (3).

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/
R PANELS AT FR47.

(2)Install access door 147BZ.
(3)Close main gear door (Ref. 32-12-11, P. Block 301).
(4)Remove warning notices.



Compressor Discharge Pneumatic Thermostat
Figure 401

TURBINE INLET PNEUMATIC THERMOSTAT - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notices
B.	Blanking Plugs/Caps
Referenced Procedure - 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

A. Job Set-Up
(1)On COMPT TEMP panel 437VU
- make certain that PACK VALVE 1 and 2 pushbutton switches are released (out).

(2)Display warning notices prohibiting pressurization of pneumatic system.
(3)Open main gear door (Ref. 32-12-11, P. Block 301).
(4)Remove air conditioning compartment access door 147BZ.

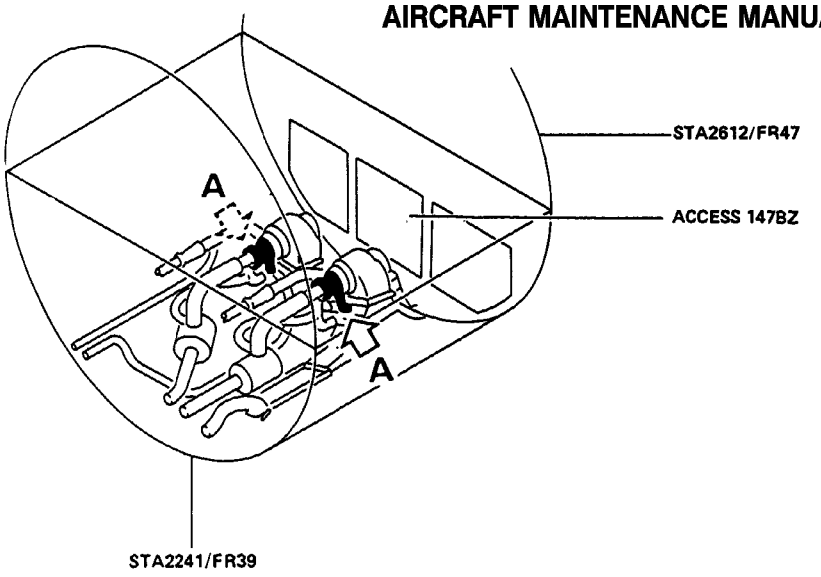
B. Removal
(Ref. Fig. 401)
(1)Remove the three screws (2) and washers (3).
(2)Remove thermostat (1) from turbine inlet duct.
(3)Blank off thermostat orifice on turbine inlet duct.

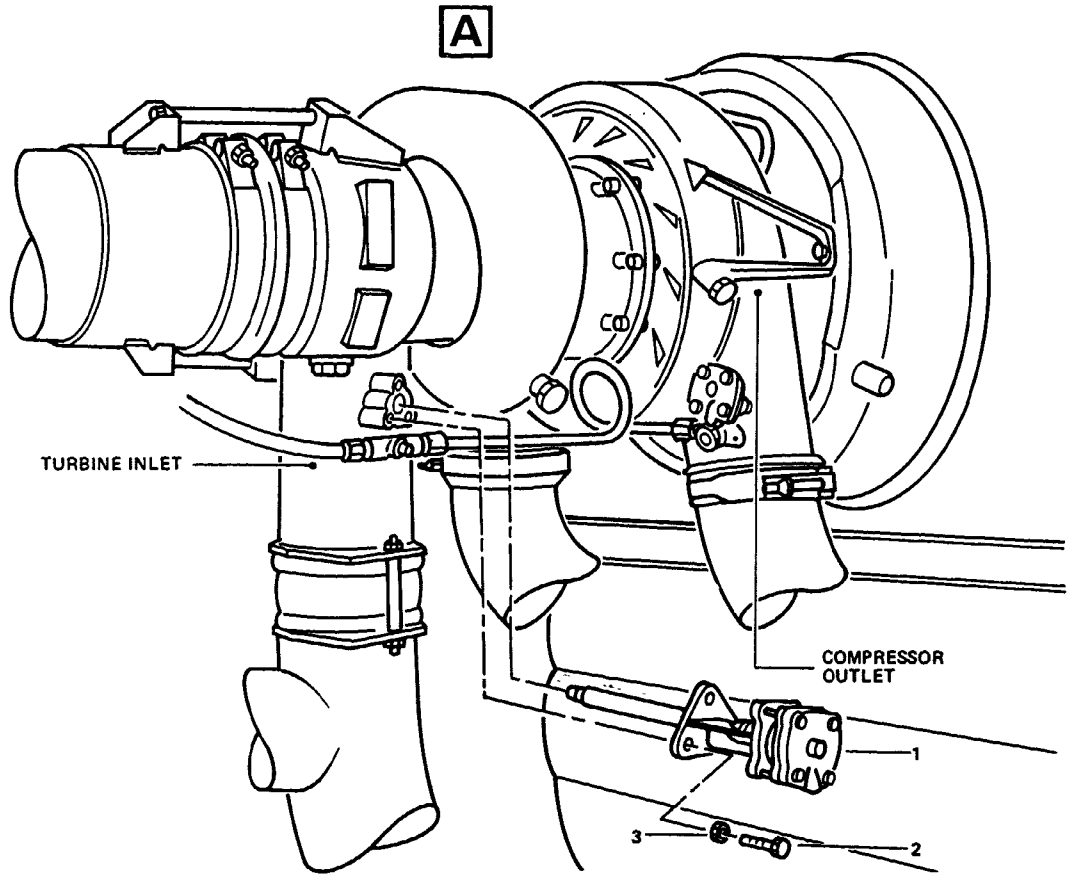
C. Installation
(1)Remove blanking plug/cap.
(2)Clean and inspect thermostat interface and/or adjacent area.
(3)Install thermostat (1) on turbine inlet duct.
(4)Install washers (3) and screws (2). Tighten screws (2).

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/
R PANELS AT FR47.

(2)Install access door 147BZ.
(3)Close main gear door (Ref. 32-12-11, P. Block 301).
(4)Remove warning notices.





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Turbine Inlet Pneumatic Thermostat
Figure 401

FAN BYPASS CHECK VALVE - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notices
B.	Lockwire Dia. 0.5 mm (0.020 in.)
Referenced Procedure - 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)On panel 437VU
- make certain that PACK VALVE 1 and 2 pushbutton switches are released (out).

(2)Display warning notices prohibiting pressurization of pneumatic system.
(3)Open main gear door (Ref. 32-12-11, P. Block 301).
(4)Remove air conditioning compartment access door 147BZ.

B. Removal

NOTE : Remove fan bypass check valve by withdrawing it in outboard direction.

(1)Cut and remove lockwire, remove screws (5) and washers (6).
(2)Remove support blanking plate (4) and seal (3).
(3)Remove check valve (2) from ram air plenum (1).

C. Installation

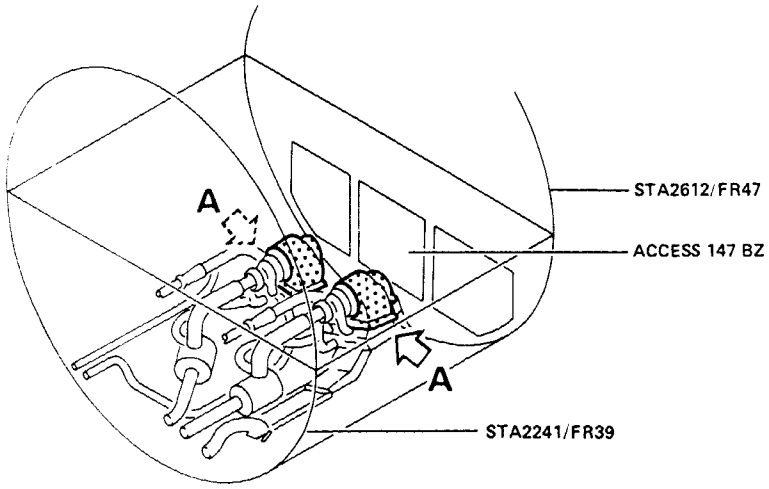
(1)Check for correct condition of check valve seal (7) and replace if necessary.
(2)Install check valve (2) in ram air plenum (1).
(3)Install seal (3) and support blanking plate (4).
(4)Install washers (6) and screws (5). Tighten screws and wirelock.

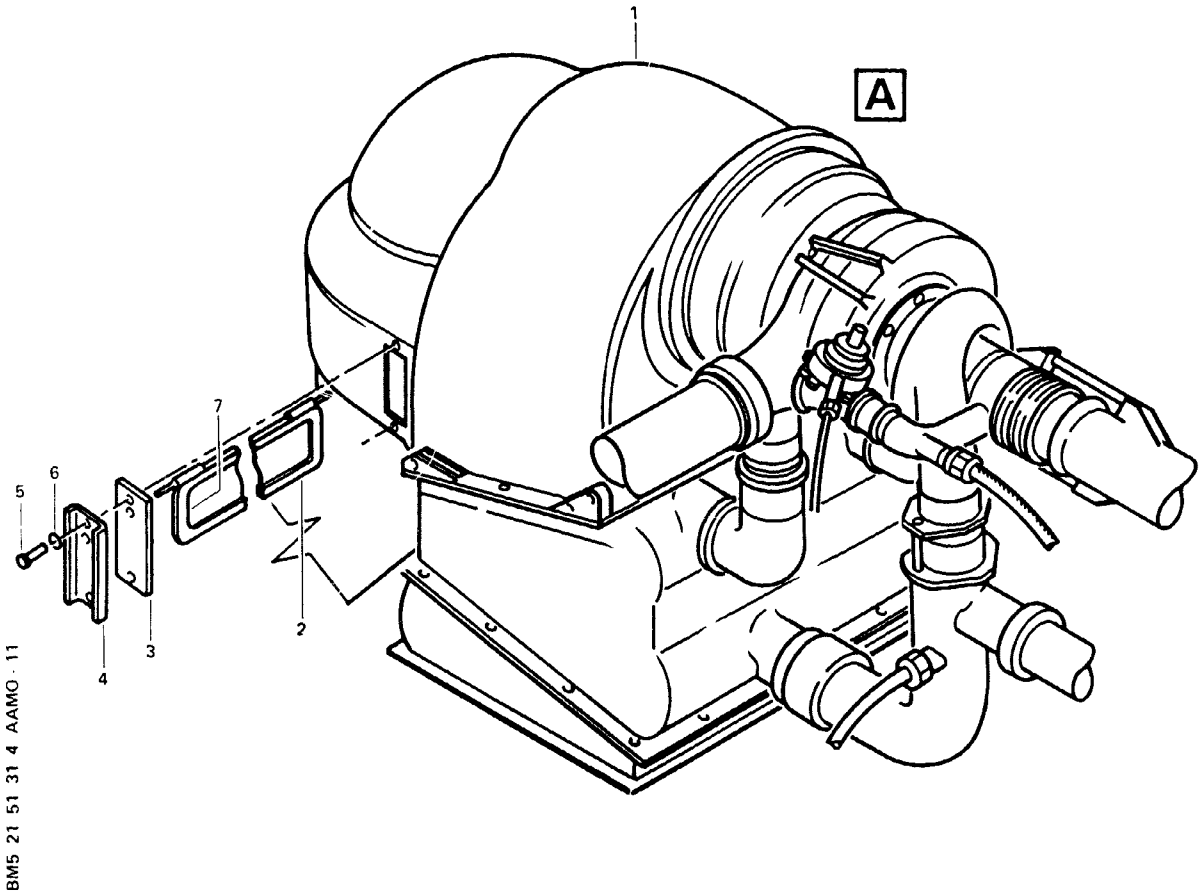
D. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/
R PANELS AT FR47.

(2)Install access door 147BZ.
(3)Close main gear door (Ref. 32-12-11, P. Block 301).
(4)Remove warning notices.





Fan Bypass Check Valve
Figure 401

HEAT EXCHANGER - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A. 98A21003003000	Jack - Exchanger Removal/Installation
B. 98A21001502000	Protective Plate - Heat Exchanger
C.	Access Platform 2.60 m (8 ft. 6 in.)
D.	Blanking Plugs/Caps
E.	Torque Wrench 0.80 m.daN (71 lbf.in.)
F.	Lockwire Dia. 0.8 mm (0.030 in.)
G.	Warning Notices
H.	O-Ring
J.	Packing
R	
R K.	Gripper Band
R L. Material No. 04-007	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 21-51-00, P. Block 501	Air Cooling System
- 21-51-36, P. Block 401	Heat Exchanger Inlet Connector
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)
- 53-15-73, P. Block 401	Cooling Air Inlet Fairings

2. Procedure

(Ref. Fig. 401)
(Ref. Fig. 402)
(Ref. Fig. 403)

A. Job Set-Up

(1)Display warning notices prohibiting pressurization of pneumatic system.
(2)Open main gear doors (Ref. 32-12-11, P. Block 301).
(3)Position access platform.
(4)Remove air conditioning compartment access door 147BZ.

B. Removal

(Ref. Fig. 401)

(1)Remove cooling air inlet fairing rear section (8) :
access door 143FL (144FR) (Ref. 53-15-73, P. Block 401).
(2)Disconnect hose (4) from orifice of pipe connecting water injectors.
(3)Disconnect drain hose (5) from water injectors.
(4)Remove nuts (21), washers (20), bolts (18) and two rods (19).
(5)Cut and remove lockwire, loosen C clamp screws (10) and disengage clamp jaws (11) by tilting them downwards.
(6)Remove cooling air inlet duct (9) and sleeve (6) connecting cooling air inlet duct (9) to cooling air inlet fairing center section (7) :
access door 143CL (144CR).
(7)Disconnect bonding strip (12) on structure side.

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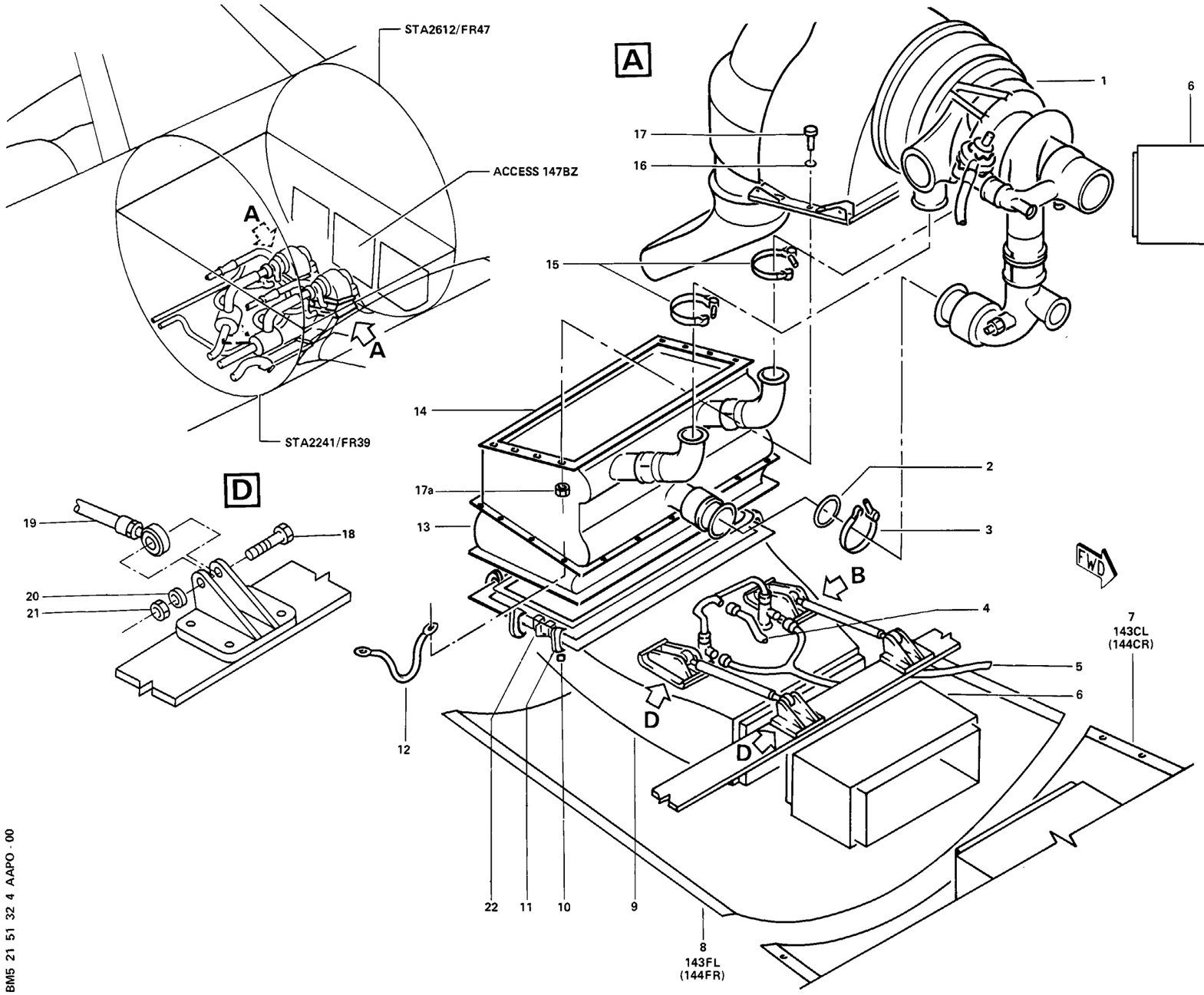

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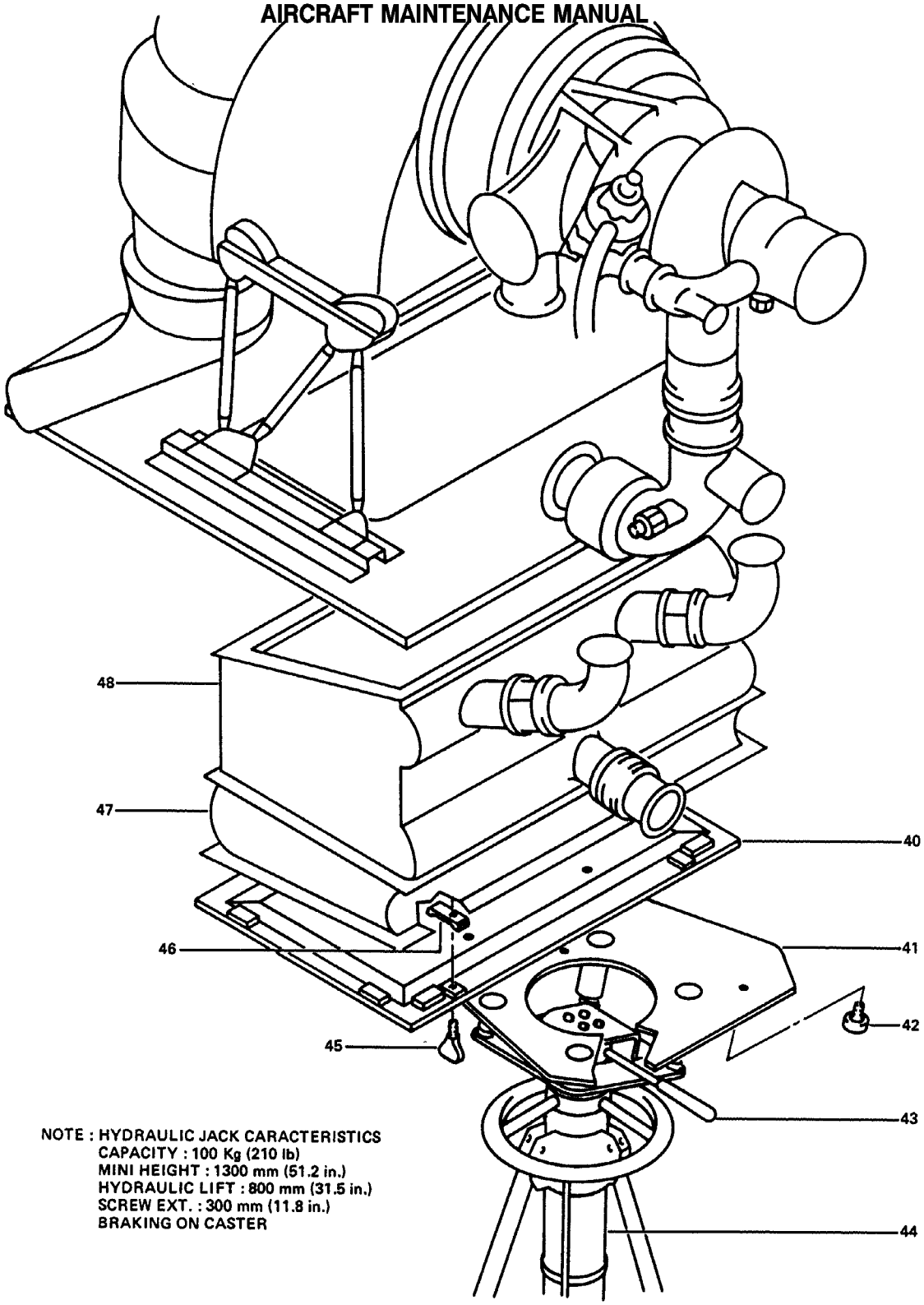
Heat Exchanger - Removal /Installation
Figure 401



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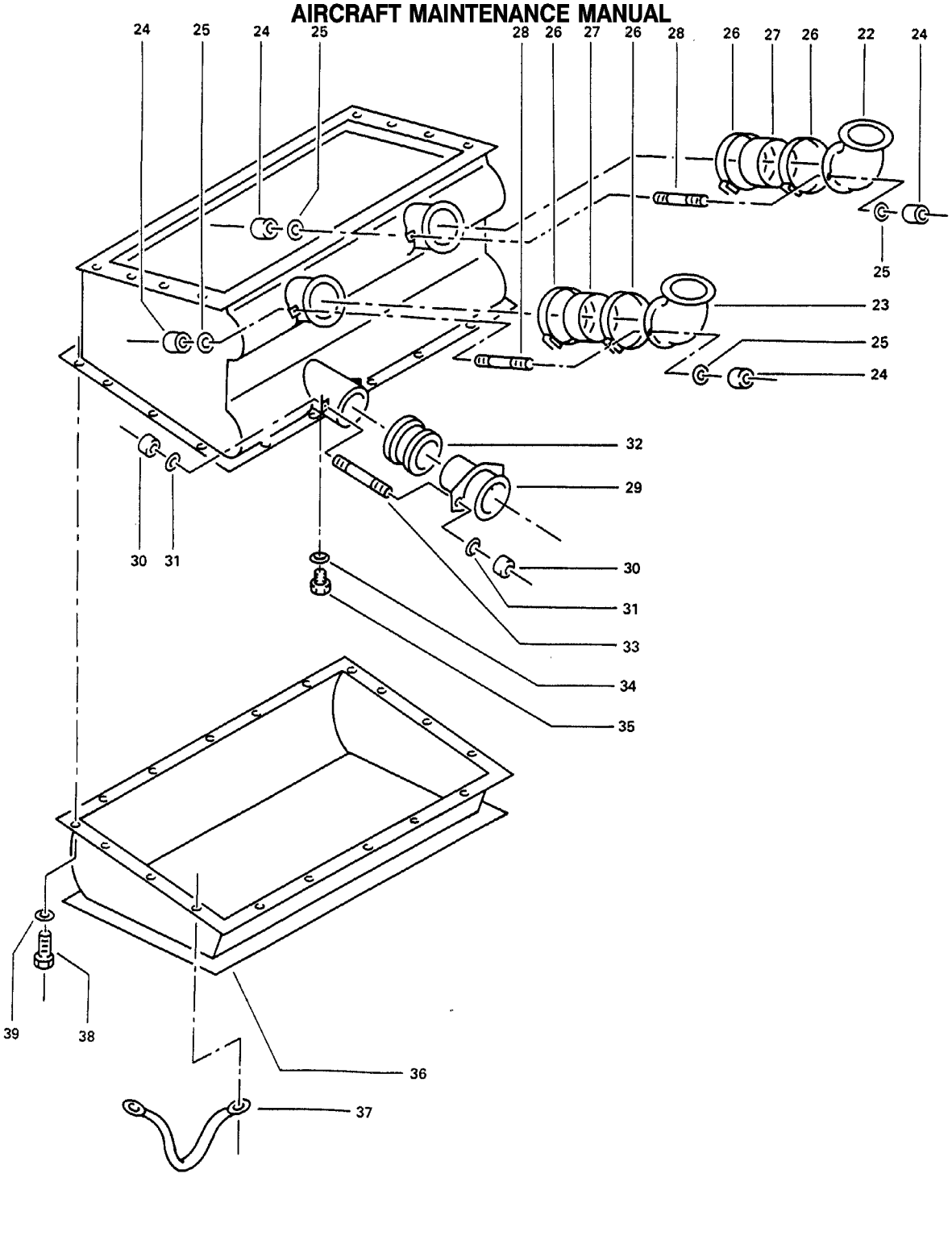
Jack - Heat Exchanger Removal/Installation
Figure 402



Heat Exchanger - Preparation of Replacement Component
Figure 403

(8)Remove clamp (3) on heat exchanger side and clamps (15) on pack side.
(9)Install heat exchanger removal/installation jack as follows (Ref. Fig. 402)
(a)Install protective plate (40) on adapter (47) ; secure plate with clamps (46) and thumb screws (45).
(b)Secure heat exchanger removal/installation jack (41) on hydraulic jack (44) rod.
(c)Position removal/installation jack/hydraulic jack assembly at opening in fuselage between FR44 and FR46.
(d)Operate hydraulic jack (44) until upper plate of removal/installation jack (41) comes into contact with protective plate (40).
(e)Secure removal/installation jack (41) on protective plate (40) with the three knurled screws (42).
(f)Apply brakes to hydraulic jack (44) caster.
(g)Lock jack (41) upper plate by means of lever (43).
(10)Remove bolts (17), nuts (17a) and washers (16) securing heat exchanger (14) to pack ram air plenum (Ref. Fig. 401).
(11)Operate hydraulic jack (44) and lower heat exchanger (14). Remove packing (2) from heat exchanger air outlet duct ; retain packing (2).
(12)Remove knurled screws (42) securing heat exchanger to removal/installation jack (41). Lower heat exchanger (14) to ground (weight is 38.5 kg (85 lb) approx.).
(13)Cap all open ends of disconnected ducts, hoses and sense lines.

C. Preparation of Replacement Component
(Ref. Fig. 403)
(1)Remove ducts and couplings from removed heat exchanger and install on replacement heat exchanger as follows :
(a)Remove nuts (24), washers (25) studs (28) from heat exchanger inlet connectors.
NOTE : These components must be retained and installed on replacement heat exchanger only when the latter is installed on pack ram air plenum.
(b)Cut and remove lockwire (if installed) and remove clamps (26). Remove and discard sleeves (27) and remove ducts (22) and (23).
(c)Remove nuts (30), washers (31), studs (33) from heat exchanger outlet coupling.
(d)Remove adapter (29) and coupling (32).
(e)Clean and check components ; replace them if necessary.
(f)Install coupling (32), adapter (29) on replacement heat exchanger outlet.
(g)Secure adapter (29) and coupling (32) by means of studs (33), washers (31), nuts (30). Tighten nuts until end play of studs (33) is at a minimum which will allow finger rotation of studs.
(h)Install new sleeves (27), ducts (22) and (23), clamps (26). Do not tighten.
(2)Remove bolts (38), washers (39), bonding strip (37) ; clean air inlet adapter (36) retained from removed heat exchanger, check for correct condition and install on replacement heat exchanger.
(3)Install adapter (36) on heat exchanger lower part, bonding strip (37), and washers (39). Install and tighten bolts (38).

(4)Clean purge plug (35) retained from removed heat exchanger and check for correct condition ; replace O-ring (34) and install on replacement heat exchanger. Coat plug (35) thread with grease (Material No. 04-007).

D. Installation

NOTE : Do not use sealant material for the installation of the sleeves (27).

R

(1)Clean and inspect heat exchanger interface and/or adjacent area.
(2)Remove blanking plugs/caps and check for correct condition of duct, hose and sense line end fittings.
Check packing (2) ; replace if necessary. Install packing (2) on heat exchanger outlet.
(3)Install heat exchanger on removal/installation jack as follows : (Ref. Fig. 402)
(a)Install protective plate (40) on adapter (47) ; secure protective plate with clamps (46) and thumb screws (45).
(b)Make certain that removal/installation jack (41) upper plate is locked.
(c)Install heat exchanger (48) equipped with adapter (47) on removal/installation jack (41). Install and tighten the three knurled screws (42).
(d)Position assembly at opening in fuselage between FR44 and FR46.
(e)Operate hydraulic jack (44) to raise heat exchanger until it comes into contact with pack ram air plenum.
(f)Make certain that heat exchanger bears correctly against pack ram air plenum and apply brakes to hydraulic jack (44) caster.
(g)Make certain that ducts between pack and heat exchanger are correctly aligned and seated.
(4)Make certain that packing (2) is correctly installed.
Install washers (16), install and tighten screws (17) securing heat exchanger (14) onto pack (1) (Ref. Fig. 401).
(5)Install clamp (3), tighten nut and TORQUE to the value given on clamp (Ref. 21-51-36, P. Block 401).
(6)Install the two clamps (15), tighten nuts and TORQUE to the value given on clamps (Ref. 21-51-36, P. Block 401).
R (7)Tighten clamps (26) ; TORQUE to value given on clamps.
R
(8)Remove removal/installation jack as follows : (Ref. Fig. 402)
(a)Remove the three knurled screws (42).
(b)Operate hydraulic jack (44) to lower removal/installation tool (41).
(c)Release brakes from hydraulic jack (44) caster and remove hydraulic jack/removal/installation jack assembly from opening in fuselage.
(d)Remove protective plate (40) from adapter (47).
(9)Connect bonding strip (12) to structure (Ref. Fig. 401).
(10)Install sleeve (6).
(11)Check for correct condition of seal on cooling air inlet duct (9).
(12)Install cooling air inlet duct (9) on sleeve (6) and on adapter (13) between the two side stops (22).
(13)Engage C clamp jaws (11) securing cooling air inlet duct (9) and tighten C clamp screws (10). Make certain that duct is correctly installed. (Ref. Fig. 401). Wirelock screws (10).

(14)Install and adjust, if necessary, two rods (19), install bolts (18), washers (20) and nuts (21). Tighten nuts (21).
(15)Connect hose (4) to center orifice of pipe connecting water injectors.
(16)Connect drain hose (5) to the two water injectors.
(17)Install cooling air inlet fairing rear section (8) : access door 143FL (144FR) (Ref. 53-15-73, P. Block 401).
(18)Perform operational test of air cooling system (Ref. 21-51-00, P. Block 501).
NOTE : If the time of the test is less than twenty minutes, let the pack run in AUTO mode to reach a total running time of twenty minutes minimum.

(19)Let the heat exchanger cool down for at least five minutes after the packs are shut down.
(20)Wirelock clamp nuts.
NOTE : Certain clamps include a self-locking nut and do not require wirelocking.
R (21)Installation of the stud nuts.
R CAUTION : DO NOT OVERTIGHTEN THE STUD NUTS BECAUSE THIS CAN CAUSE
R DAMAGE TO THE HEAT EXCHANGER.
R (a)Install studs (28), washers (25) and nuts (24). Tighten stud nuts (24) until end play of studs is at a minimum which will allow finger rotation of studs.

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/ PANELS AT FR47.
(2)Install access door 147BZ.
(3)Close main gear doors (Ref. 32-12-11, P. Block 301).
(4)Remove access platform.
(5)Remove warning notices.

HEAT EXCHANGER - INSPECTION/CHECK

1. Reason for the Job
   To check that heat exchanger is efficient.

2. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 49-00-00, P. Block 501	Airborne Auxiliary Power

3. Procedure

A. Job Set-Up
(1) Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2) Make certain that electronics racks ventilation is correct.
(3) Make certain that overhead panel circuit breakers are closed, particularly those on VENT panel 22VU, COMPT TEMP panel 22VU, AIR BLEED panel 22VU, VENTILATION panel 131VU and AIR BLEED & COMPT TEMP panel 131VU.
(4) On AIR BLEED section of panel 436VU
- check that BLEED VALVE/ENG 1 and ENG 2 pushbutton switches are pressed (in) (AUTO)
- check that APU BLEED switch is in OFF/R position.
(5) On COMPT TEMP panel 437VU
- check that PACK VALVE 1 and 2 pushbutton switches are released (out) (OFF legends on and flowbar off).
(6) On ENG START section of panel 429VU
- check that ENG START selector is in OFF position and that START 1 and 2 pushbutton switches are released (out).
(7) On PACK TEMP panel 441VU
- check that PACK 1 MODE SEL and PACK 2 MODE SEL pushbutton switches are pressed (in) (AUTO).
(8) On CABIN PRESS panel 432VU
- check that OUTFLOW/FWD and AFT pushbutton switches are pressed (in) (both outflow valves open).
(9) Check that ENG 1 and 2 FIRE handles are pushed.
(10) On ECAM control panel
- press BLEED pushbutton switch
  . pushbutton switch integral light comes on
  . on right ECAM displayh unit, AIR BLEED page is displayed
- using LEFT and RIGHT DISPLAY knobs, adjust brightness on left and right ECAM display units.

B. Inspection/Check
(1) Start-up APU (Ref. 49-00-00, P. Block 501).
(2) On AIR BLEED section of panel 436VU
- place APU BLEED switch in ON position
  (flowbar on APU BLEED annunciator comes on)

- check that X FEED valve position pushbutton switch flowbar is in line.

(3)Check that AIR BLEED/PRESS indicator reads between 20 and 30 psi.

(4)On COMPT TEMP panel 437VU
Press PACK VALVE 1 pushbutton switch (OFF legend goes off and flowbar comes on).

(5)On PACK TEMP panel 441VU
- release PACK 1 MODE SEL pushbutton switch (MAN legend comes on)
- hold PACK 1 manual temperature control selector switch in COLD position until turbine by-pass valve position arrows indicates C on AIR BLEED page (ECAM).

(6)After 1 minute APU RPM stabilization, perform following check.
(Ref. Fig. 601)

(a)Record AMBIENT TEMP.

(b)Record BLEED PRESS.

(c)Plot graph intersection point of AMBIENT TEMP and BLEED PRESS lines.

(d)From intersection point trace a horizontal line up to MAX RECOMMENDED TURB INLET TEMP scale.

(e)Read MAX RECOMMENDED TURB INLET TEMP value and compare with temperature displayed on AIR BLEED page (ECAM)
- heat exchanger should be removed for cleaning if turbine inlet temperature is higher than MAX RECOMMENDED TURB INLET TEMP read on chart.

(7)On PACK TEMP Panel 441VU
- press PACK 1 MODE SEL pushbutton switch (AUTO) (MAN legend goes off). Turbine by-pass valve indicating arrow is at its initial position.

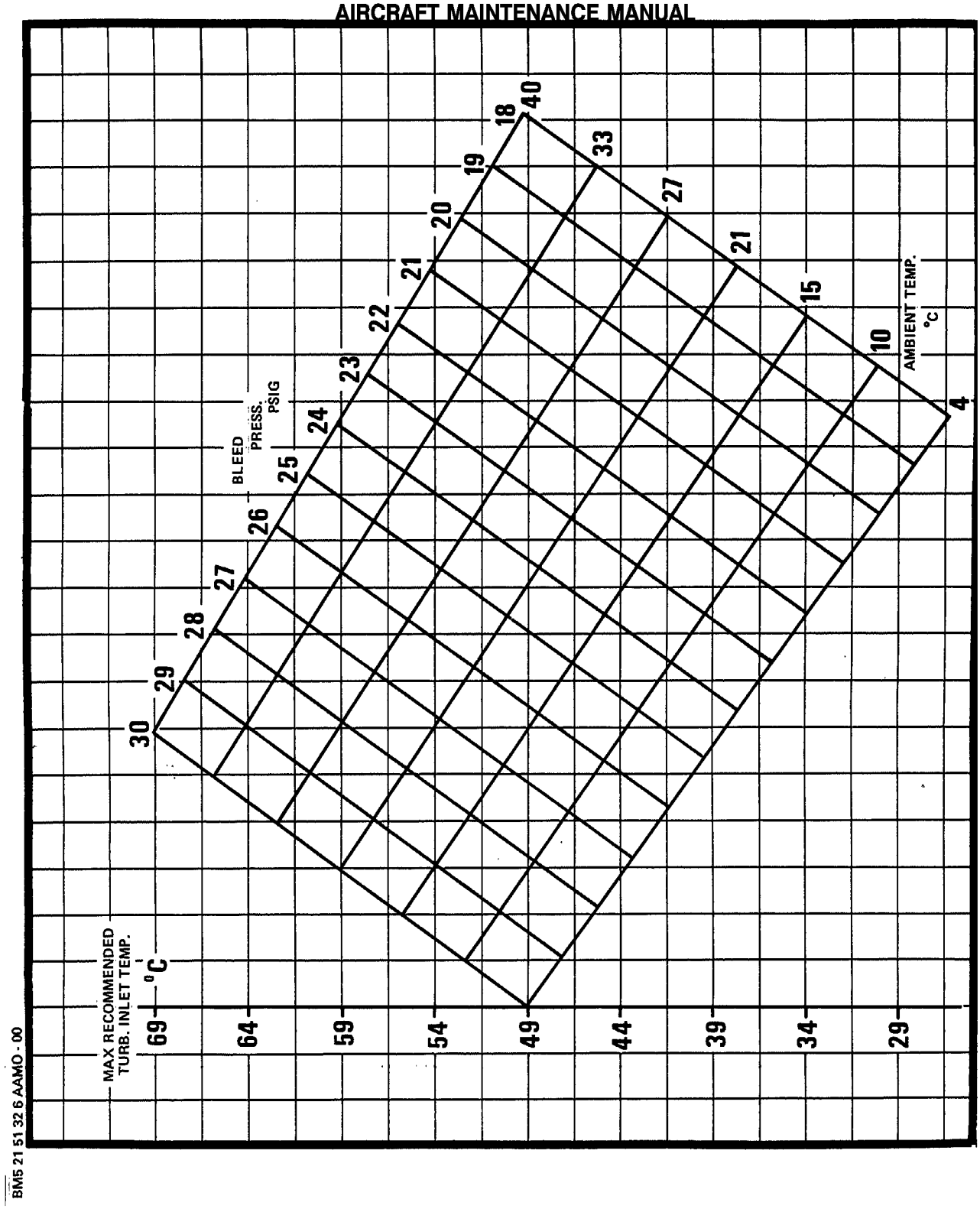
(8)On COMPT TEMP panel 437VU
- release PACK VALVE 1 pushbutton switch (OFF legend comes on and flowbar goes off).

(9)Perform same operation as above to check heat exchanger of pack 2.

C. Close-Up

(1)Shutdown APU (Ref. 49-00-00, P. Block 501).

(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. BLock 301).



Heat Exchanger - Chart
Figure 601

PACK DEFLECT DOOR ACTUATOR 9HW (10HW) - REMOVAL/INSTALLATION

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

NOTE : The removal/installation procedure is identical for actuators 9HW and 10HW.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs/Caps
B.	O-Ring
C.	Circuit Breaker Safety Clips
D.	Warning Notices
Referenced Procedures	
- 32-12-11, P. Block 301	Main Gear Main Door-(Ground Door(s) Opening)
- 21-51-35, P. Block 501	Pack Deflect Door Actuator

R 2. Procedure
R (Ref. Fig. 401)
R (Ref. Fig. 402)

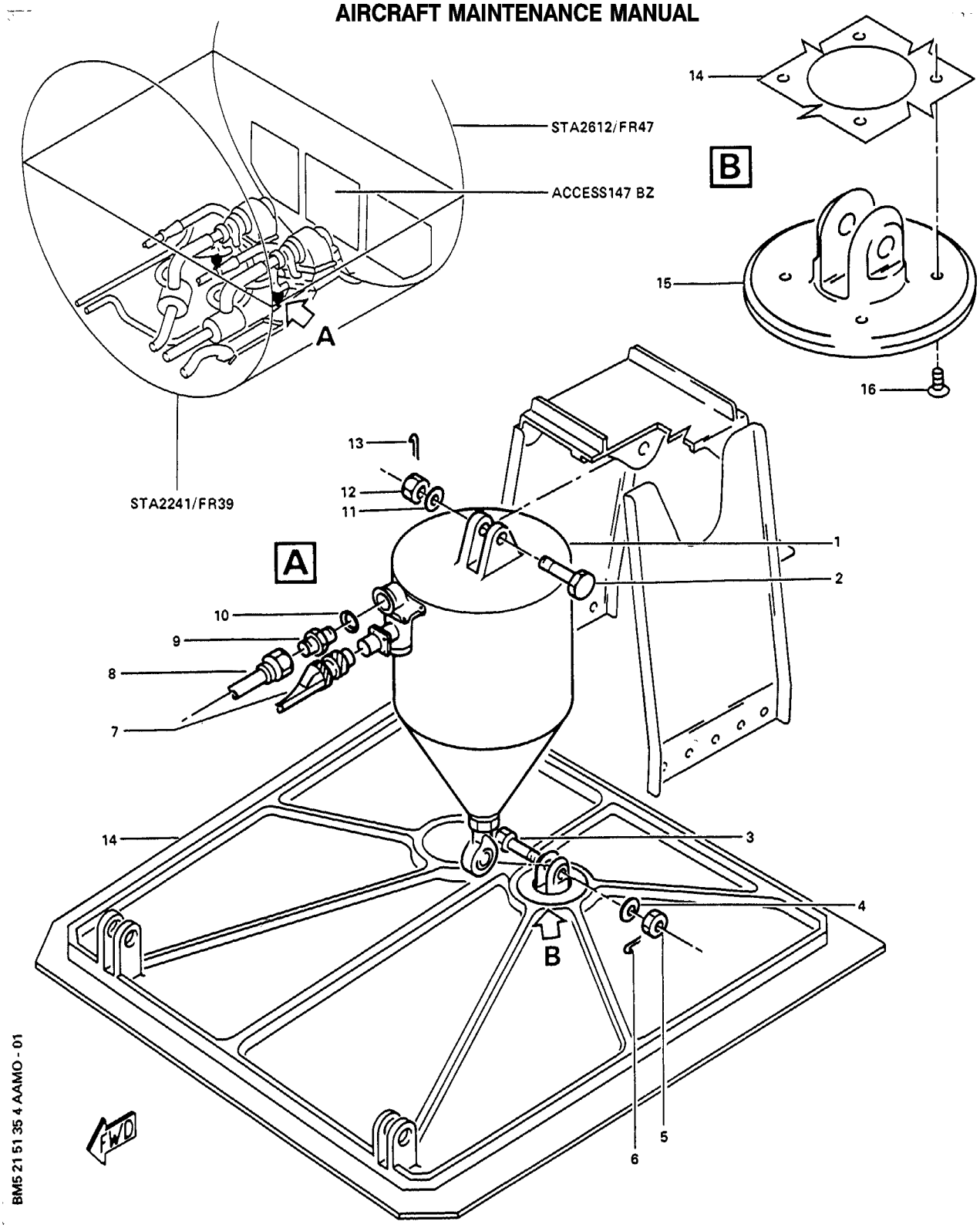
A. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	PACK 1/DEFLECT DOOR	1HW	311/H56
131VU	PACK 2/DEFLECT DOOR	2HW	312/G56

(2)On COMPT TEMP panel 437VU
- make certain that PACK VALVE 1 (2) pushbutton switch is released (out).

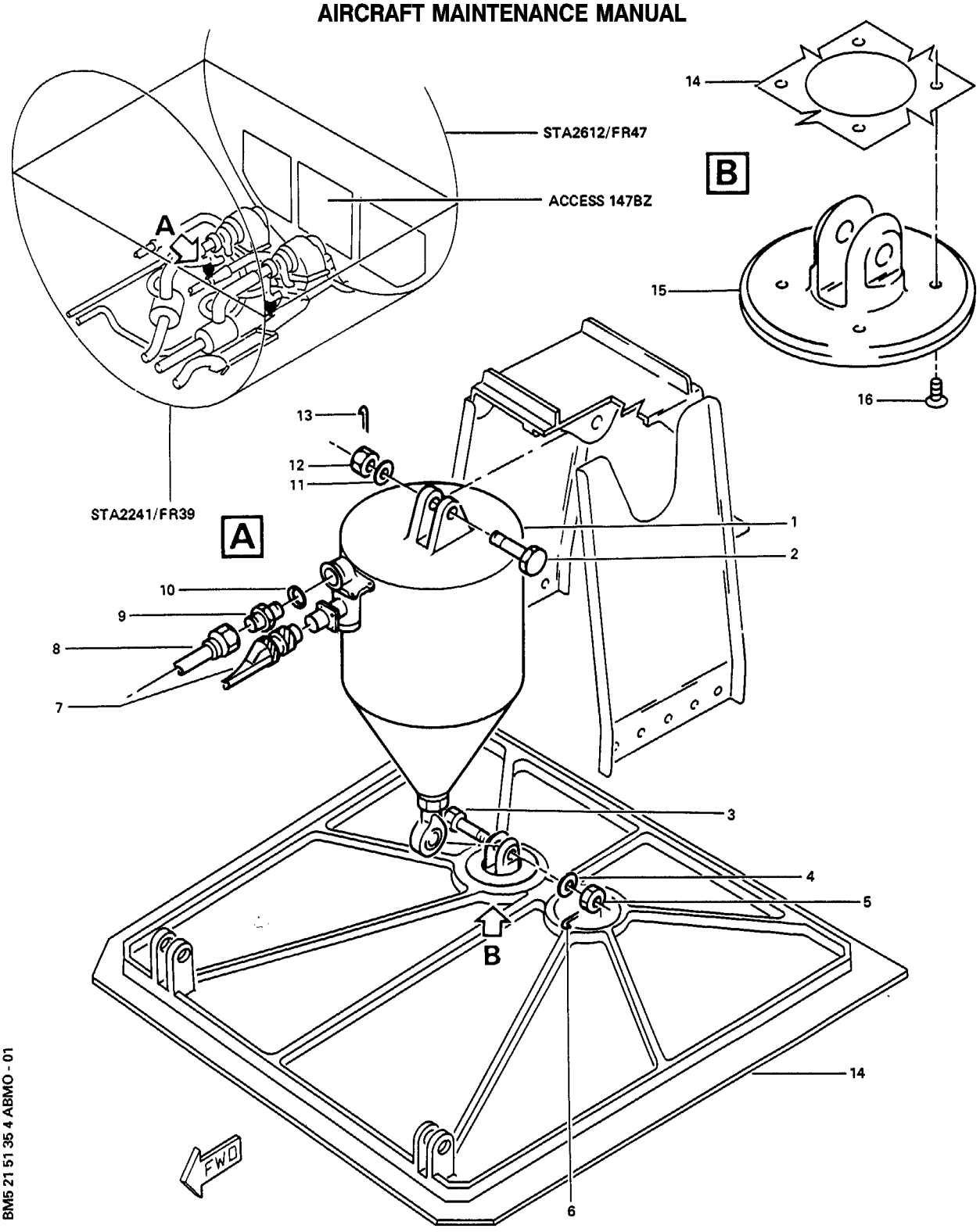
(3)Display warning notices prohibiting pressurization of pneumatic system.
(4)Open main gear doors (Ref. 32-12-11, P. Block 301).
(5)Remove air conditioning compartment access door 147BZ.

B. Removal
(1)Disconnect electrical connector (7).
(2)Disconnect line (8) and discard O-ring (10).
(3)Remove screws (16) securing clevis (15) to deflect door (14).
(4)Remove cotter pin (13), nut (12), washer (11).
(5)Hold actuator (1) while removing bolt (2).
(6)Lay down actuator (1) against structure.
(7)Manually open deflect door (14) to free clevis (15).
(8)Remove cotter pin (6), nut (5) and washer (4).
(9)Hold clevis (15) while removing bolt (3).



Left Pack Deflect Door Actuator 9HW
Figure 401

R



Right Pack Deflect Door Actuator 10HW
Figure 402

R

(10)Remove clevis (15) and actuator (1).
(11)Cap open line end and electrical connector.

C. Preparation of Replacement Component
(1)Clean and check for correct condition of adapter (9) retained from removed actuator and install on replacement component with new O-ring (10).

D. Installation
(1)Remove blanking caps and check for correct condition of line end and electrical connector (7).
(2)Clean and inspect attach lugs and actuator adjacent area.
(3)Manually open pack deflect door (14).
(4)Install clevis (15) on deflect door (14).
(5)Install rod end of actuator (1) in clevis (15). Install bolt (3), washers (4), nut (5) and cotter pin (6).
(6)Manually close deflect door (14), install actuator (1) on mounting and install bolt (2).
NOTE : Check that deflect door (14) bears correctly against seal resets and flush with pack cooling air inlet fairing. If necessary, adjust rod end of actuator (1). After adjustment, tighten locknut.
(7)Install washer (11), nut (12) and cotter pin (13).
(8)Install screws (16) to secure clevis (15) on deflect door (14).
(9)Connect line (8).
(10)Connect electrical connector (7).

E. Test
(1)Carry out operational test (Ref. 21-51-35, P. Block 501).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/
R PANELS AT FR47.
(2)Install access door 147BZ.
(3)Close main gear doors (Ref. 32-12-11, P. Block 301).
(4)Remove warning notices.
(5)Remove safety clips and tags and close circuit breakers 1HW and 2HW.

1. Operational Test
WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

A. Reason for the Job
To make certain that pack deflect doors operate correctly.

**ON A/C 101-200,

B. Equipment and Materials

ITEM	DESIGNATION
(1)860135958100001	Wheel Generator Driving Device
OR	
860135958100003	Wheel Generator Driving Device

R

Referenced Procedures

- 79-34-11, P. Block 401	Low Oil Pressure Switch
- 24-41-00, P. Block 301	AC External Power Control
- 49-00-00, P. Block 501	Airborne Auxiliary Power

**ON A/C ALL

Post SB 32-2058 For A/C 101-200,

B. Equipment and Materials

ITEM	DESIGNATION
(1)860135958100001	Wheel Generator Driving Device
or	
860135958100004	Wheel Generator Driving Device

Referenced Procedures

- 79-34-11, P. Block 401	Low Oil Pressure Switch
- 24-41-00, P. Block 301	AC External Power Control
- 49-00-00, P. Block 501	Airborne Auxiliary Power

**ON A/C ALL

C. Procedure
(1)Job set-up
WARNING : BEFORE PROCEEDING WITH TESTS, MAKE CERTAIN THAT THERE ARE NO

FOREIGN BODIES IN THE COOLING AIR INLETS. SINCE TESTS REQUIRE OPERATION OF THROTTLE CONTROL LEVERS MAKE CERTAIN THAT ONE OR MORE PASSENGER/CREW DOORS ARE OPEN IN ORDER TO AVOID INCREASE IN ΔP DUE TO CLOSING OF CABIN PRESSURE OUTFLOW VALVES.

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Make certain that electronics racks ventilation is correct.

(c)Make certain that circuit breakers are closed, particularly those associated with **CABIN PRESS, AIR BLEED & COMPT TEMP** on panel 131VU, and those associated with **THRUST REVERSER** on panel 133VU.

(d)Make certain that **ENG1** and **ENG2** throttle control levers are in forward idle throttle position.
(e)On **CABIN PRESS** panel 432VU.
- **OUTFLOW FWD** and **AFT** pushbutton switches are pressed (in)
- **MAN PRESS** pushbutton switch is released (out)
- outflow valves position indicators are in 0 position
- **AUTO PRESS/REG** 1 and 2 pushbutton switches are pressed (in).

(f)On **COMPT TEMP** panel 437VU
- release **PACK VALVE** 1 and 2 pushbutton switches (**OFF** legends on).

(g)Remove main landing gear tachometer drive shroud assembly from wheel No.5, LH side, and wheel No. 7, RH side.
(h)Install wheel generator driving device on wheel No.5.

R (i)Pressurize pneumatic system :
R 1 Using APU :
R - Start up APU (Ref. 49-00-00, P. Block 501, Starting).
R 2 Using HP ground pneumatic source :
R - Connect HP ground air supply units to HP ground connectors.
R (j)On engine 1 and engine 2 low oil pressure switches :
R - Disconnect and cap electrical connectors (Ref. 79-34-11, P. Block 401).

(2)Test

ACTION	RESULT
1. Place **ENG1** throttle control lever in forward full throttle position.	- Extension of deflect door actuator (left cooling air inlet fully blanked off).
2. Place **ENG1** throttle control lever in forward idle throttle position.	- Immediate retraction of deflect door actuator (left cooling air inlet clear).
3. Place **ENG2** throttle control lever in forward full throttle position.	- Extension of deflect door actuator (right cooling air inlet fully blanked off).

ACTION	RESULT
4. Place ENG2 throttle control lever in forward idle throttle position.	- Immediate retraction of deflect door actuator (right cooling air inlet clear).
5. On test set - simulate speed > 70kts (588 RPM approx.)	- extension of deflect door actuator (left cooling air inlet fully blanked off)
- simulate speed < 70kts (588 RPM approx.)	- retraction of deflect door actuator after 10 seconds (left cooling air inlet clear).
6. Cut off test set power supply, remove wheel generator driving device and install it on wheel No.7.	
7. On test set - simulate speed > 70kts (588 RPM approx.)	- extension of deflect door actuator (right cooling air inlet fully blanked off).
- simulate speed < 70kts (588 RPM approx.)	- retraction of deflect door actuator after 10 seconds (right cooling air inlet clear).

(3)Close-up
(a)Disconnect wheel generator driving device.
(b)Install landing gear tachometer drive shroud assembly.
(c)Shut down air supply
- from APU (Ref. 49-00-00, P. Block 501)
- from HP ground connectors
- shut down and disconnect HP ground air supply units.

(d)On engine 1 and engine 2 low oil pressure switches
- connect electrical connectors (Ref. 79-34-11, P. Block 401).

(e)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(f)Restore system and aircraft to normal operating condition.

PACK DEFLECT DOOR ACTUATOR 9HW (10HW) - DEACTIVATION/REACTIVATION

Ref. : MEL Sect. 1-21, item 2a
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL
WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Deactivation

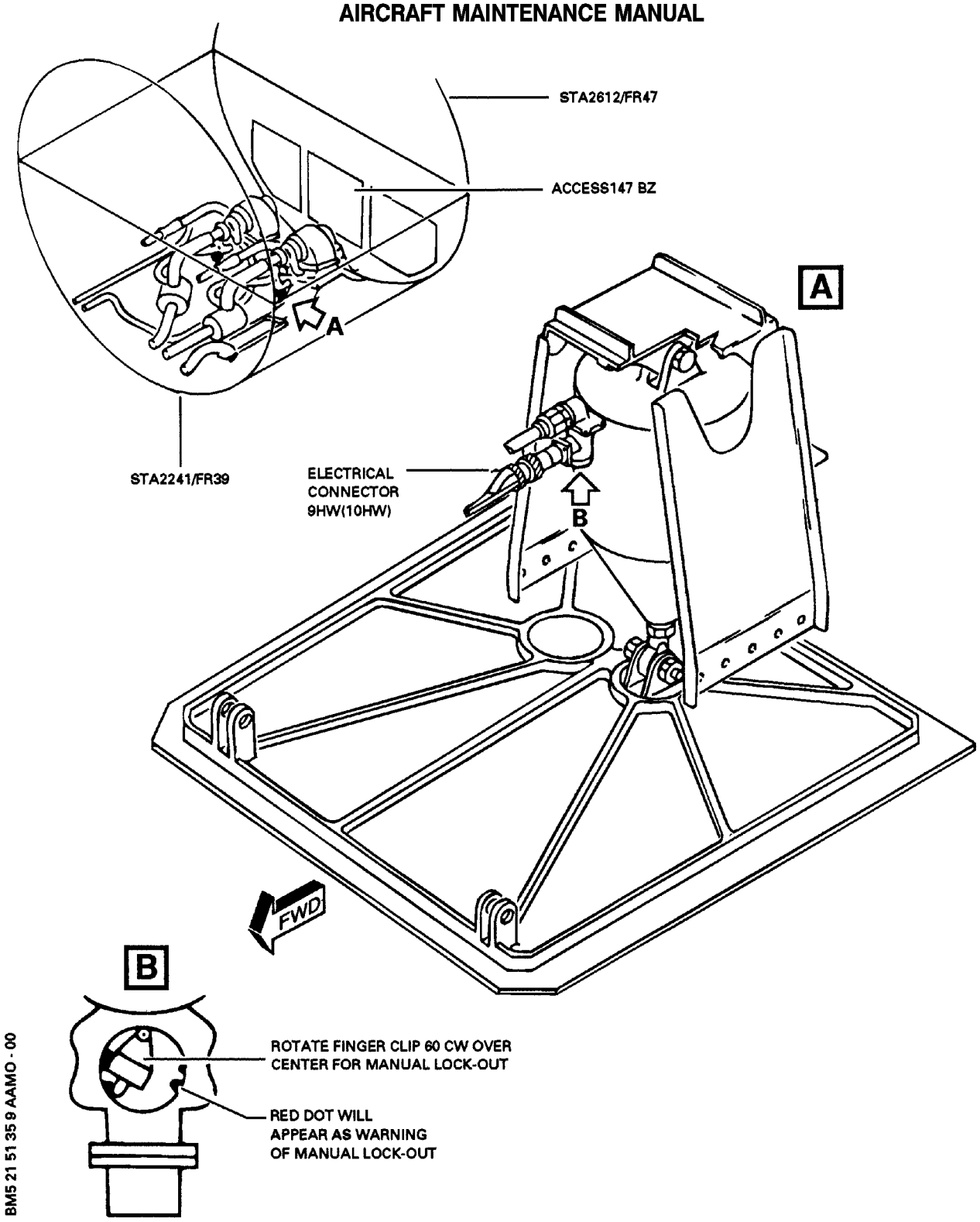
A. Equipment and Materials

ITEM	DESIGNATION
(1)	Warning Notice
(2)	Circuit Breaker Safety Clips
(3)	Blanking Plugs/Caps
(4)	Tape
Referenced Procedure - 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Procedure
(Ref. Fig. 901)
(1)Job set-up
(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	AIR BLEED & COMPT TEMP/PACK 1/ DEFLECT DOOR	1HW	311/H56
131VU	AIR BLEED & COMPT TEMP/PACK 2/ DEFLECT DOOR	2HW	312/G56

(b)Open main gear door (Ref. 32-12-11, P. Block 301).
(c)Remove air conditioning compartment access door 147BZ.
(2)Deactivation
(a)Rotate finger clip 60° clockwise over center for manual lock-out. Red dot will appear as warning of manual lock-out.
(b)Disconnect and cap electrical connector 9HW (10HW).
(c)Stow electrical cable and plug, and secure with tape.
(d)Remove safety clips and tags and close circuit breakers 1HW and 2HW.
(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS
R DOORS/PANELS AT FR47.
(b)Install access door 147BZ.
(c)Close main gear door (Ref. 32-12-11, P. Block 301).
(d)Install a temporary placard in the flight compartment to warn the flight crew that pack 1 (2) deflect door actuator 9HW (10HW) is deactivated.



Pack Deflect Door Actuator
Figure 901

(e)Make an entry in the aircraft technical log

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Warning Notice
(2)	Circuit Breaker Safety Clip
Referenced Procedure - 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Procedure (Ref. Fig. 901)

(1)Job set-up

(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	AIR BLEED & COMPT TEMP/PACK 1/ DEFLECT DOOR	1HW	311/H56
131VU	AIR BLEED & COMPT TEMP/PACK 2/ DEFLECT DOOR	2HW	312/G56

(b)Open main gear door (Ref. 32-12-11, P. Block 301).

(c)Remove air conditioning compartment access door 147BZ.

(2)Reactivation

(a)Place actuator locking device in normal operating position by manually rotating finger clip 60° counterclockwise.

(b)Remove blanking plug/cap from electrical plug and receptable.

(c)Connect electrical connector 9HW (10HW).

(d)Close circuit breaker 1HW (2HW).

(e)Troubleshoot the system (Ref. TSM 21-51-00).

(3)Close-up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS
R DOORS/PANELS AT FR47.

(b)Install access door 147BZ.

(c)Close main gear door (Ref. 32-12-11, P. Block 301).

(d)Remove warning notice and temporary placard.

(e)Clear technical log.

HEAT EXCHANGER INLET CONNECTOR - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Material

ITEM	DESIGNATION
A.	Access Platform 2.60 m (8 ft. 6 in.)
B.	Blanking Plugs/Caps
C.	Torque Wrench 0.80 m.daN (71 lbf.in.)
D.	Warning Notices
E.	Lockwire Dia. 0.8 mm (0.030 in.)
R F. 2215569-2 or R 2215569-3 or R 2215569-4	Sleeves
R G.	Gripper Band
Referenced Procedures	
- 21-51-00, P. Block 501	Air Cooling System
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)
- 53-15-73, P. Block 401	Cooling Air Inlet Fairings

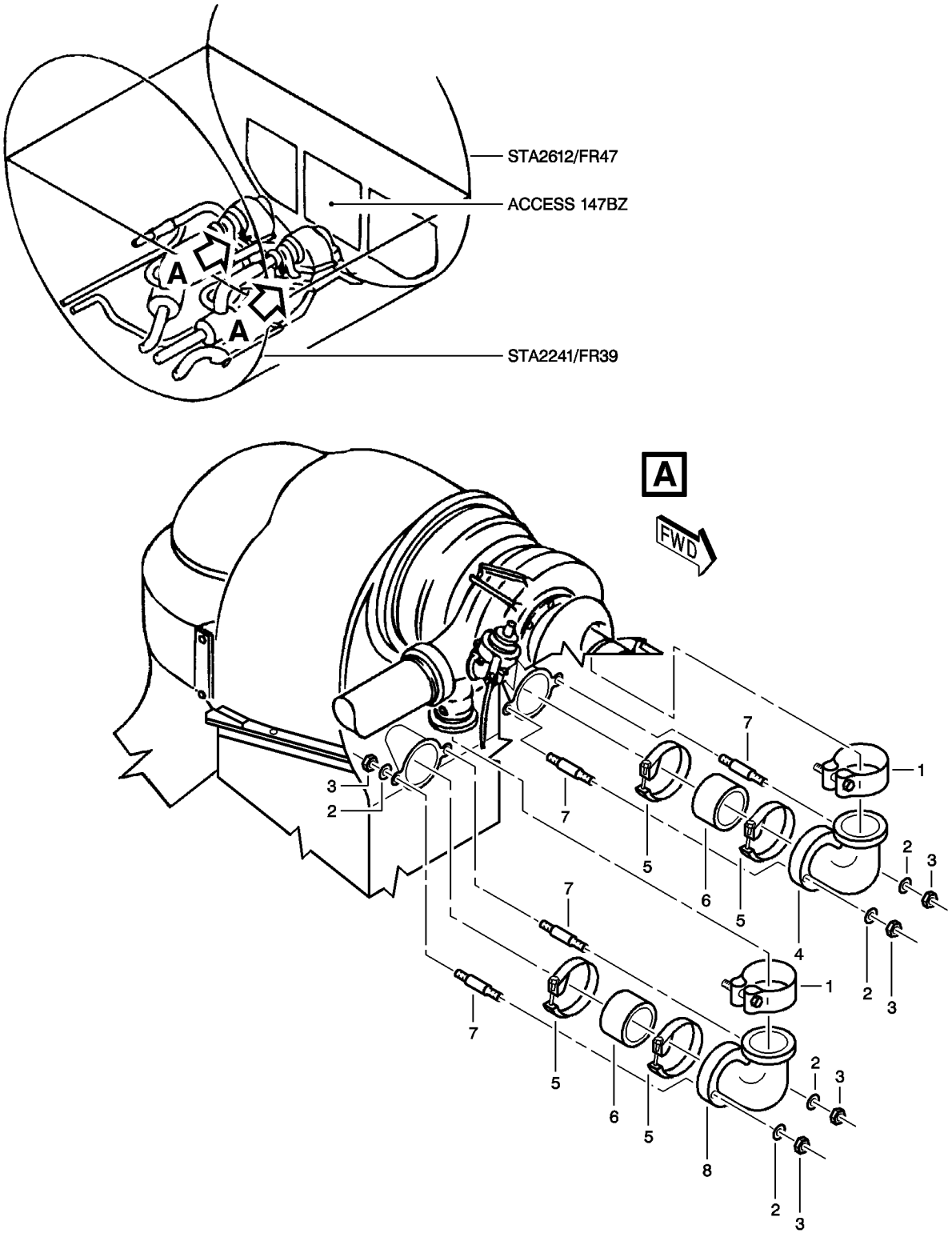
2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Display warning notices prohibiting pressurization of pneumatic system.
(2)Open main gear doors (Ref. 32-12-11, P. Block 301).
(3)Position access platform.
(4)Remove air conditioning compartment access door 147BZ.

B. Removal
(1)Remove clamps (1).
(2)Remove nuts (3), washers (2), studs (7) from heat exchanger inlet couplings.
(3)Cut and remove lockwire (if installed), and remove clamps (5).
(4)Remove and discard sleeves (6) and remove ducts (4) and (8).
(5)Cap all open ends of disconnected ducts.

C. Installation
(1)Clean and inspect heat exchanger interface and/or adjacent area.
(2)Remove blanking plugs/caps and check for correct condition of ducts.
R (3)Install ducts (4) and (8) and new sleeves (6) with gripper band.
NOTE 1 : Do not use sealant material for the installation of the sleeves (6).

(4)Install clamps (1) and TORQUE to the value given on clamp.
(5)Install clamps (5) and TORQUE to the value given on clamp.
(Do not install the studs and do not wirelock clamp nuts at this stage).
(6)Perform operational test of air cooling system (Ref. 21-51-00,



Heat Exchanger Inlet Connector
Figure 401

P. Block 501).

NOTE : If the time of the check is less than twenty minutes, let the pack run in AUTO mode to reach a total running time of twenty minutes minimum.

(7)Let the heat exchanger cool down for at least five minutes after the packs are shut down.

(8)Wirelock clamp nuts.

NOTE : Certain clamps include a self-locking nut and do not require wirelocking.

R (9)Installation of the stud nuts.

R CAUTION : DO NOT OVERTIGHTEN THE STUD NUTS BECAUSE THIS CAN CAUSE
R DAMAGE TO THE HEAT EXCHANGER.

R (a)Install studs (7), washers (2) and nuts (3). Tighten stud nuts (3) until end play of studs is at a minimum which will allow finger rotation of studs.

D. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/ PANELS AT FR47.

(2)Install access door 147BZ.

(3)Close main gear doors (Ref. 32-12-11, P. Block 301).

(4)Remove access platform.

(5)Remove warning notices.

3. Alternate Procedure

NOTE : This procedure can be used in hot ambient conditions for removal/ installation for the outboard heat exchanger inlet connectors. This procedure is longer than the other.

(Ref. Fig. 402)

A. Job Set-Up

(1)Display warning notices prohibiting pressurization of pneumatic system.

(2)Position access platform.

B. Removal

(1)Remove access door 143FL (144FR) (Ref. 53-15-73, P. Block 401) at cooling air inlet fairing rear section.

(2)Remove clamps (1).

(3)Remove nuts (3), washers (2), studs (7) from heat exchanger inlet couplings.

(4)Cut and remove lockwire (if installed), and remove clamps (5).

(5)Remove and discard sleeves (6) and remove ducts (4) and (8).

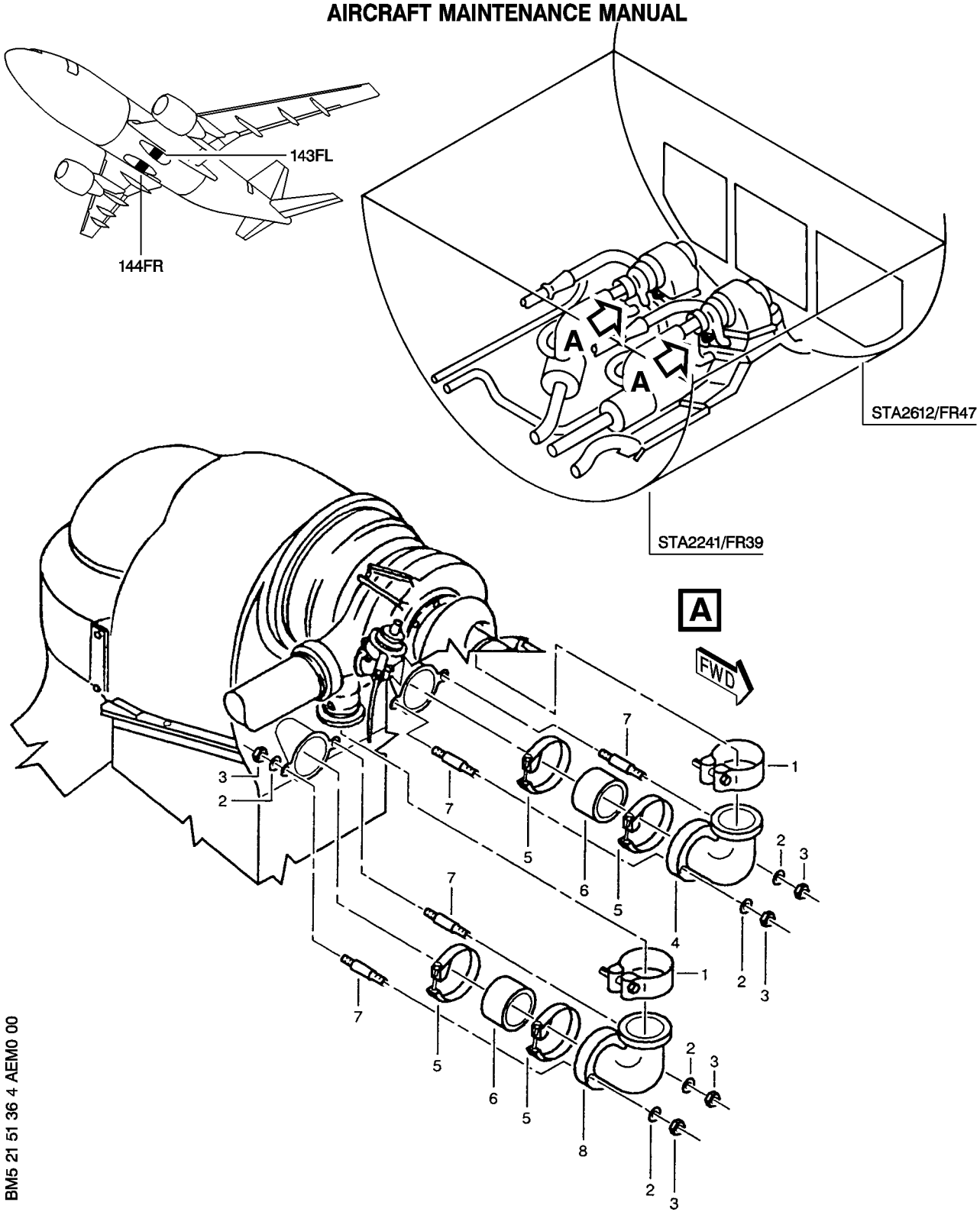
(6)Cap all open ends of disconnected ducts.

C. Installation

(1)Clean and inspect heat exchanger interface and/or adjacent area.

(2)Remove blanking plugs/caps and check for correct condition of ducts.

(3)Install ducts (4) and (8) and new sleeves (6) with gripper band.



Heat Exchanger Inlet Connector
Figure 402

NOTE 1 : Do not use sealant material for the installation of the sleeves (6).

(4)Install clamps (1) and TORQUE to the value given on clamp.
(5)Install clamps (5) and TORQUE to the value given on clamp.
(Do not install the studs (7) and do not wirelock clamp nuts at this stage).
(6)Perform operational test of air cooling system (Ref. 21-51-00, P. Block 501).
NOTE : If the time of the check is less than twenty minutes, let the pack run in AUTO mode to reach a total running time of twenty minutes minimum.
(7)Let the heat exchanger cool down for at least five minutes after the packs are shut down.
(8)Wirelock clamp nuts.
NOTE : Certain clamps include a self-locking nut and do not require wirelocking.
R (9)Installation of the stud nuts.
R CAUTION : DO NOT OVERTIGHTEN THE STUD NUTS BECAUSE THIS CAN CAUSE
R DAMAGE TO THE HEAT EXCHANGER.
R (a)Install studs (7), washers (2) and nuts (3). Tighten stud nuts (3) until end play of studs is at a minimum which will allow finger rotation of studs.
(10)Install access door 143FL (144FR) (Ref. 53-15-73, P. Block 401) at cooling air inlet fairing rear section.

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/ PANELS AT FR47.
(2)Install access door 147BZ.
(3)Close main gear doors (Ref. 32-12-11, P. Block 301).
(4)Remove access platform.
(5)Remove warning notices.

EMERGENCY RAM AIR INLET - DESCRIPTION AND OPERATION

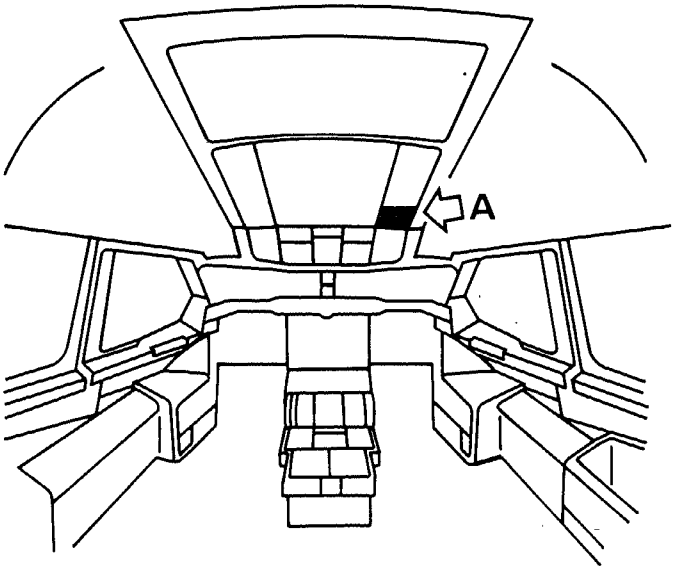
1. General

The emergency ram air inlet enables the cabin and avionics compartment to be ventilated by ram air in the event of failure of both refrigeration unit packs.

2. Component Location

(Ref. Fig. 001)
(Ref. Fig. 002)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
4HZ	P/BSW-COMPT TEMP/RAM AIR	437VU	212		21-53-00
7HZ	ACTUATOR-EMERGENCY RAM AIR INLET		143	147BZ	21-53-11
0038	CHECK VALVE-EMERGENCY RAM AIR INLET		135	131SW	21-53-12



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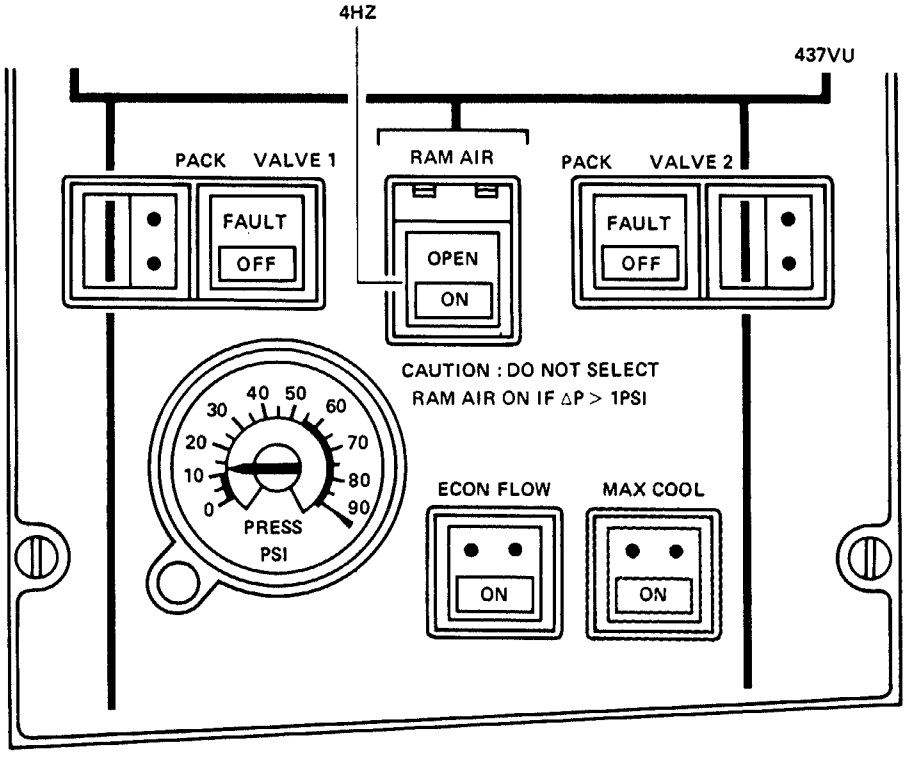

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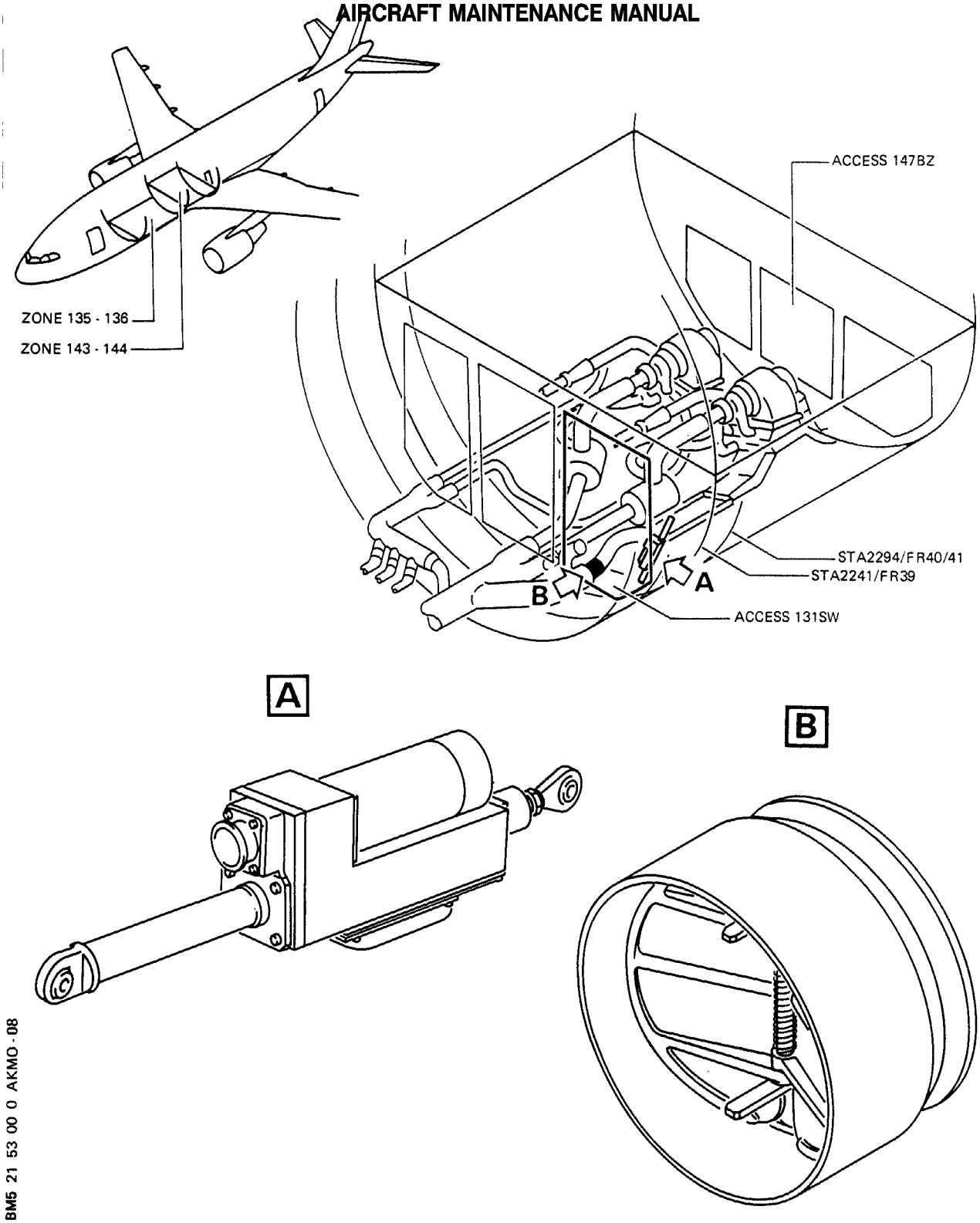
Emergency Ram Air Inlet - Controls and Indicating
Figure 001



Emergency Ram Air Inlet - Component Location
Figure 002

3. Description

(Ref. Fig. 003)
Air is bled forward of the left refrigeration unit pack cooling air inlet through an emergency ram air inlet. Air is then ducted to the cold air manifold through a check valve.
The emergency ram air inlet flap is actuated by emergency ram air inlet actuator 7HZ. The actuator is controlled by **RAM AIR** pushbutton switch 7HZ equipped with a guard :
- pushbutton switch pressed (in) (**ON** amber legend and **OPEN** green legend are on) : opening of the emergency ram air inlet
- pushbutton switch released (out) : closure of the emergency ram air inlet.

The open and closed positions of the emergency ram air inlet are shown on the synoptic diagram on the **AIR BLEED** page on the right **ECAM** display unit (Ref. 31-51-00).

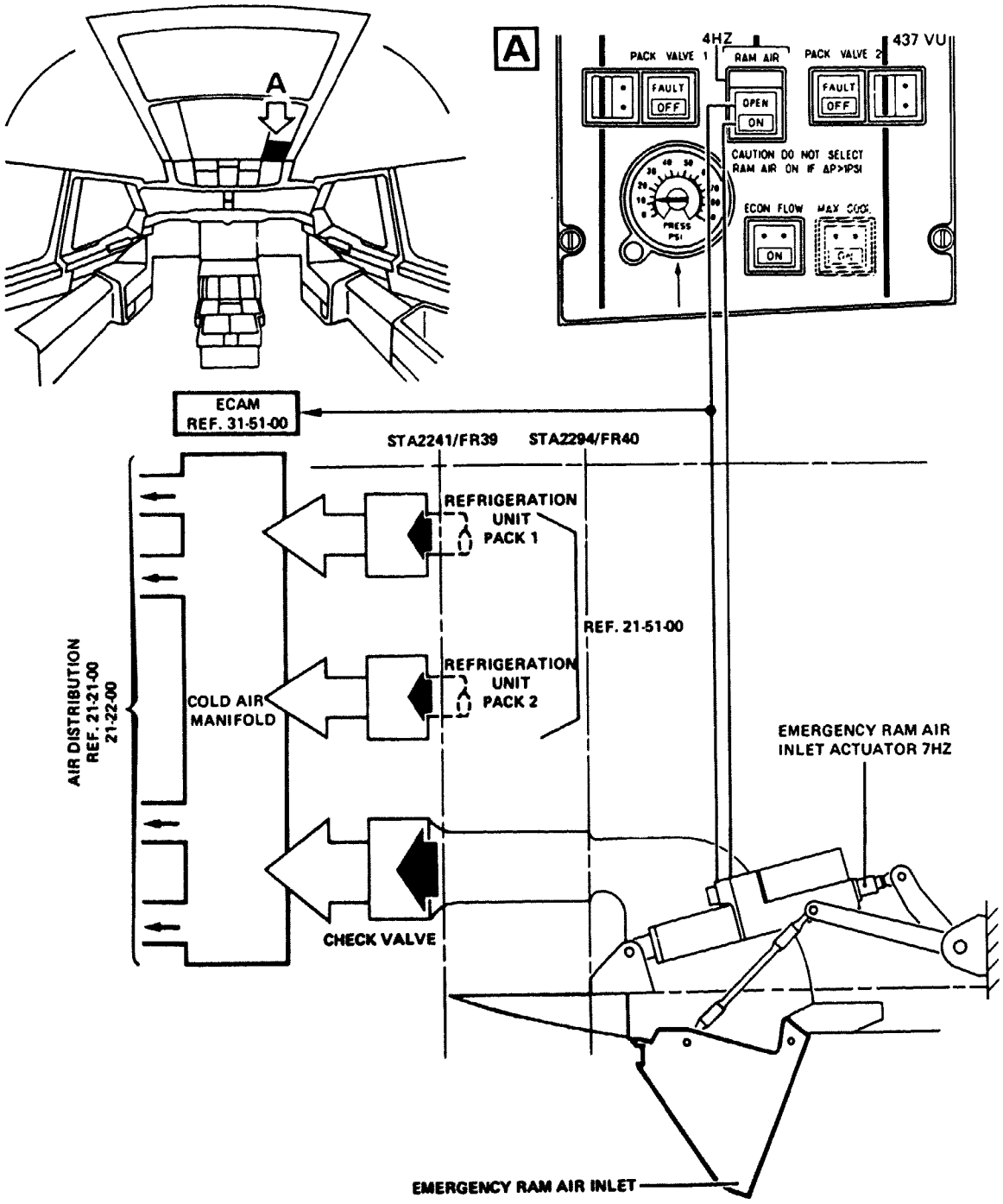
4. Component Description

A. Emergency Ram Air Inlet Actuator 7HZ
(Ref. Fig. 004)
The actuator operates a flap designed to open or close the emergency ram air inlet.
It mainly consists of :
- a 28VDC electric motor rotating in two directions which incorporates an electromagnetic brake
- a mechanical assembly which transforms the rotational movement of the motor into a linear movement
- two limit microswitches which cut off power supply to the motor before mechanical stop is reached
- two position indicating microswitches (actuator retracted or extended).

B. Check Valve
(Ref. Fig. 005)
The check valve serves to prevent evacuation of conditioning air through the emergency ram air inlet.
It is of the two semi-circular flap type spring-loaded closed. An arrow engraved on the valve body indicates the airflow direction.
Angular positioning of the check valve on the aircraft duct is ensured by a locating stud which engages in a notch provided on the duct.

5. Operation
(Ref. Fig. 006)
RAM AIR pushbutton switch 4HZ pressed (in) (**ON** legend on)
- emergency ram air inlet actuator 7HZ retracts and drives the flap by means of a rod mechanism to open the emergency ram air inlet
- **OPEN** legend on pushbutton switch comes on when the emergency ram air inlet is fully open (actuator retracted).

RAM AIR pushbutton switch 4HZ released (out) (**ON** legend off)
- the actuator extends and causes the emergency ram air inlet to close
- **OPEN** legend on pushbutton switch goes off when the emergency ram air inlet



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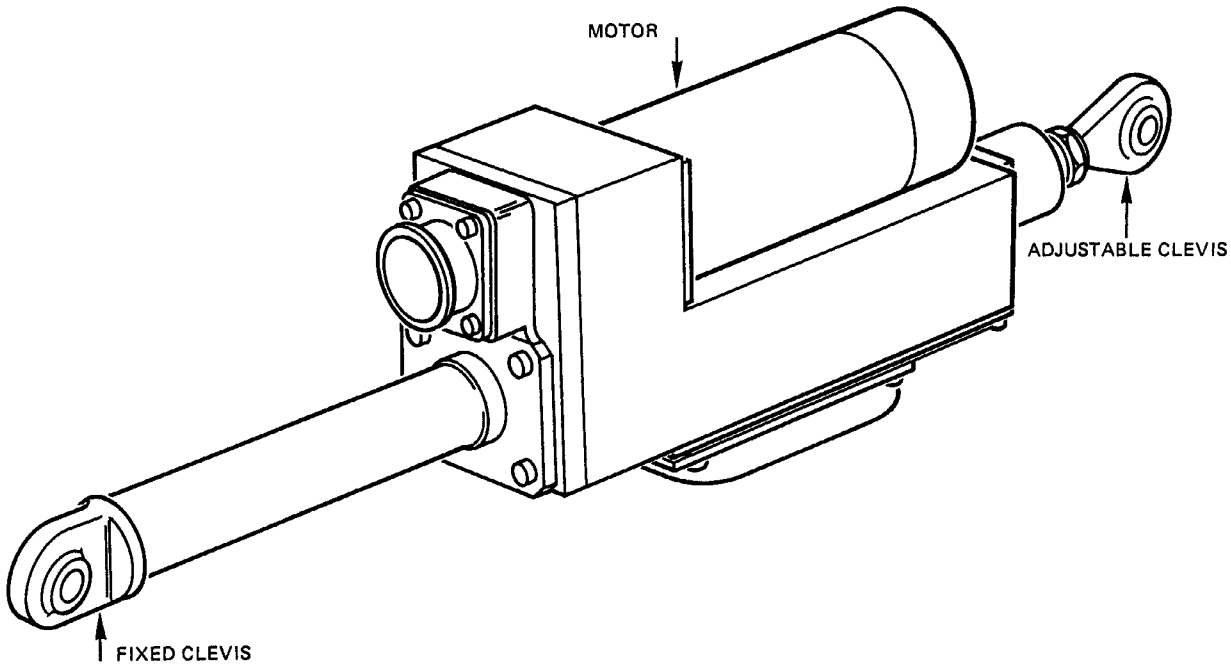
Emergency Ram Air Inlet - Airflow Diagram
Figure 003



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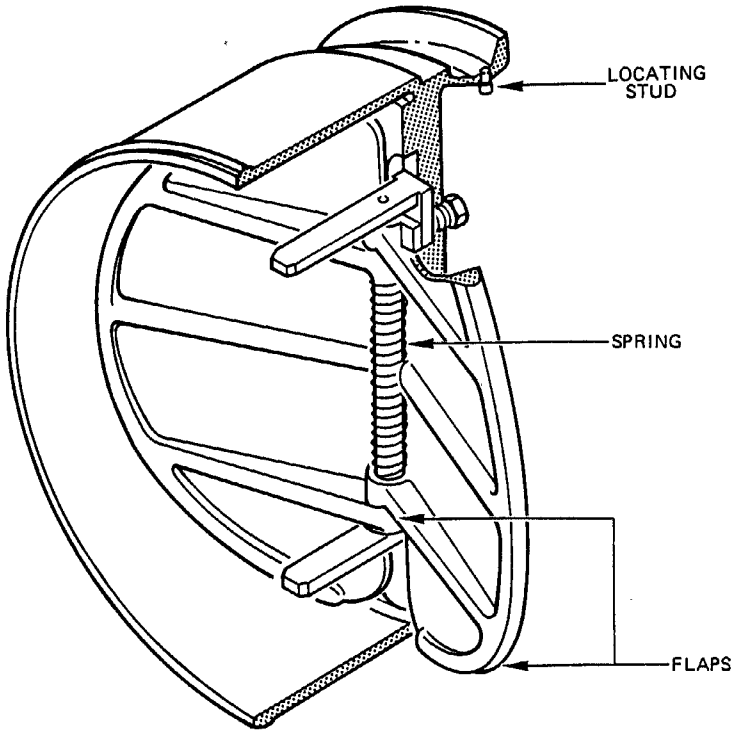
Emergency Ram Air Inlet Actuator
Figure 004



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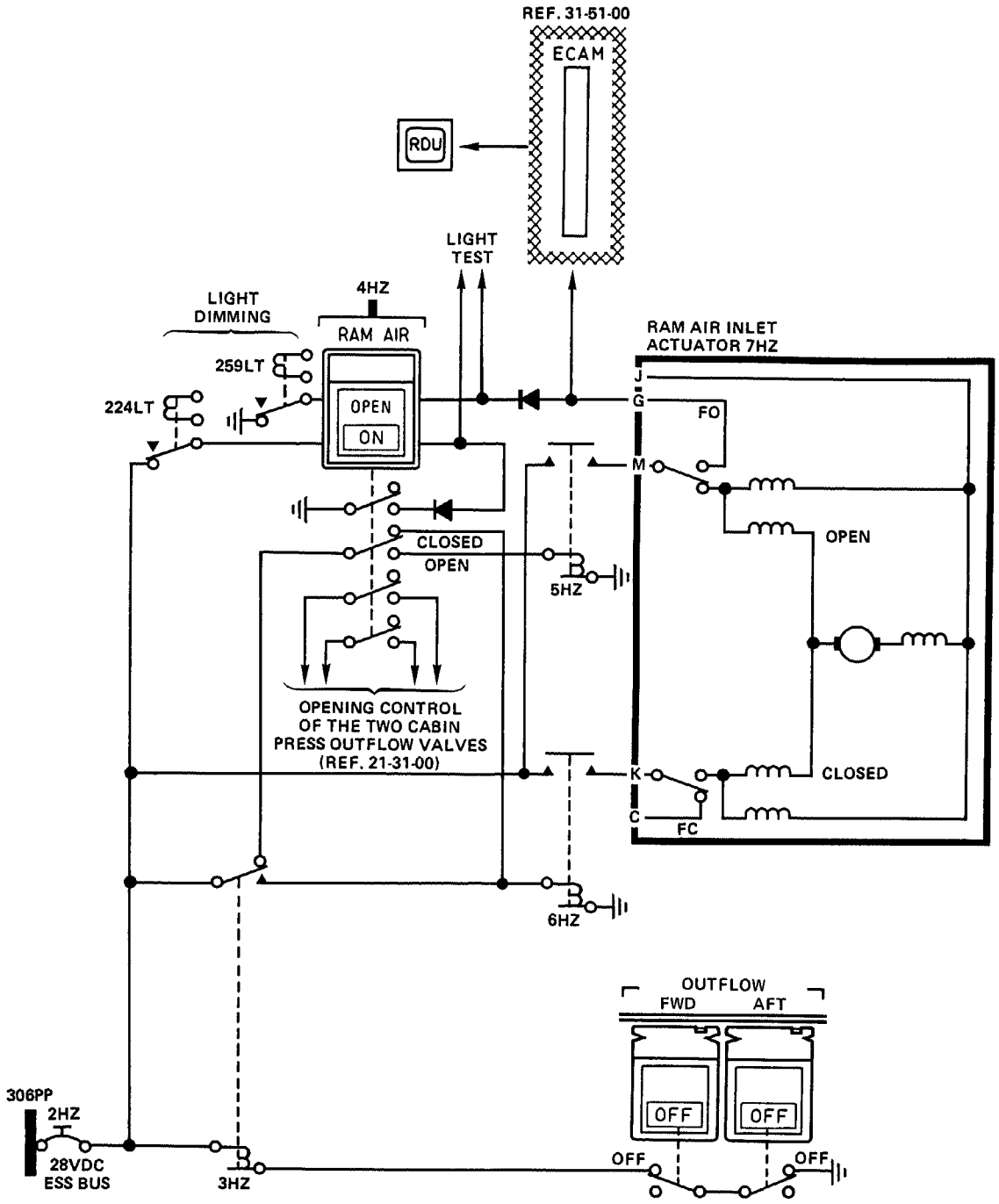
Emergency Ram Air Inlet Check Valve
Figure 005



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Emergency Ram Air Inlet - Schematic
Figure 006

is no longer open.

NOTE : - If the two cabin pressure outflow valves are controlled to the closed position (**CABIN PRESS/OUTFLOW/FWD** and **AFT** pushbutton switches released (out), **OFF** legends on), it causes automatic closure of the emergency ram air inlet.

- Opening of the emergency ram air inlet (**RAM AIR** pushbutton switch pressed (in), **ON** legend on) causes the full opening of the two cabin pressure outflow valves (Ref. 21-31-00).

1. Operational Test

A. Reason for the Job
- to check for correct operation of emergency ram air inlet.
- to check opening of cabin pressure outflow valves.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

(1)Job set-up

(a)Make certain that circuit breakers are closed, particularly those associated with AIR BLEED, CABIN PRESS, HYDRAULIC (LDG GEAR PROX DET & RELAYS 1GB and 2GB), ECAM.

(b)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(c)Make certain that electronics racks ventilation is correct.

(d)On CABIN PRESS panel 432VU
- make certain that OUTFLOW FWD and AFT pushbutton switches are pressed (in).
- make certain that AUTO PRESS/REG1 and REG2 pushbutton switches are pressed (in).

(e)On ECAM control panel (center pedestal)
- using RIGHT DISPLAY knob adjust brightness on right ECAM display unit
- press BLEED or PRESS pushbutton switch as necessary
  . light on BLEED or PRESS pushbutton switch comes on
  . on right ECAM display unit, AIR BLEED or CAB PRESS page is displayed
- to select new page, press CLR pushbutton switch on ECAM control panel and select new page.

(2)Test

WARNING : MAKE CERTAIN THAT NOTHING PREVENTS EMERGENCY RAM AIR INLET FLAP OPERATION.

NOTE : During the test, configuration of OFF legends on OUTFLOW FWD and AFT pushbutton switches is to be disregarded.

(a)Check for correct operation of emergency ram air inlet actuator and flap.

ACTION	RESULT
1. On COMPT TEMP panel 437VU - press RAM AIR pushbutton switch.	On COMPT TEMP panel 437VU - ON legend on RAM AIR pushbutton switch comes on

ACTION	RESULT
	- OPEN legend on RAM AIR pushbutton switch comes on when emergency ram air inlet is open. On AIRBLEED page - emergency ram air inlet is indicated open. Emergency ram air inlet is open (opening time : 10 to 15 seconds).
2. On COMPT TEMP panel 437VU - release RAM AIR pushbutton switch.	On COMPT TEMP panel 437VU - OPEN and ON legends on RAM AIR pushbutton switch go off. On AIR BLEED page - emergency ram air inlet is indicated closed. Emergency ram air inlet is closed.

(b)Check of cabin pressure outflow valves opening.
CAUTION : PRESSURIZATION PHASE IS ACTIVATED.
MAKE CERTAIN THAT PASSENGER/CREW DOORS ARE OPEN.
NOTE : During the test disregard configuration of warning lights on panels 3VU and 5VU.

ACTION	RESULT
1. On LANDING ELEVATION selector 104HM - select -2000 ft.	
R 2. On panel 133VU, open the following circuit breakers : L/G PROX DET/& RELAYS/SYS 1/ RELAYS &/RETRACT/CTL 2GB (location 332/U51 and L/G PROX DET/ & RELAYS SYS 2/FLT/GND 1GB (location 331/V52).	On CABIN PRESS panel 432VU - FWD and AFT outflow valves position indicators move to C position. On CAB PRESS page (R ECAM display unit) - FWD and AFT cabin pressure outflow valve pointers move to closed position.
3. On COMPT TEMP panel 437VU - press RAM AIR pushbutton switch.	On COMPT TEMP panel 437VU - ON legend on RAM AIR pushbutton switch comes on. - OPEN legend on RAM AIR pushbutton switch comes on when emergency ram air inlet is open.
R	On CABIN PRESS panel 432VU - FWD and AFT outflow valves position indicators move to O position. On CAB PRESS page (R ECAM display

	ACTION	RESULT
R		unit) - **FWD** and **AFT** cabin pressure outflow valve pointers move to open position.
	- release **RAM AIR** pushbutton switch.	On **COMPT TEMP** panel **437VU** - **OPEN** and **ON** legends on **RAM AIR** pushbutton switch go off.
R		On **CABIN PRESS** panel **432VU**
R		- **FWD** and **AFT** outflow valves
R		position indicators move to
R		**C** position.
R		On **CAB PRESS** page (**R ECAM** display
R		unit) - **FWD** and **AFT CABIN** pressure outflow valve pointers move to closed position.
R	4. On panel **133VU**	On **CABIN PRESS** panel **432VU**
R	- close circuit breakers **1GB** and	- **FWD** and **AFT** outflow valves
R	**2GB**.	position indicators move to
R		**O** position.
R		On **CAB PRESS** page (**R ECAM** diplay
R		unit) - **FWD** and **AFT** cabin pressure outflow valve pointers move to open position.

(3)Close-up
(a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Restore system and aircraft to normal operating condition.

EMERGENCY RAM AIR INLET - INSPECTION/CHECK

1. Reason for the Job

R To check for wear and freedom of flappers of ram air intake check valve
R and inspect inlet scoop and duct.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2 m (6 ft. 7 in.)
B.	Warning Notice
Referenced Procedure	
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)
R - 53-15-73, P. Block 401	Cooling Air Inlet Fairings

3. Procedure

A. Job Set-Up

R (1)Position access platform at cooling air inlet fairing to be removed.
R (2)Remove cooling air inlet fairing 143AL (Ref. 53-15-73, P. Block 401).
R (3)Open one main gear door (Ref. 32-12-11, P. Block 301).
R (4)Open air conditioning compartment access door 147BZ.
R (5)Display a warning notice on COMPT TEMP panel 437VU to prohibit operation of RAM AIR pushbutton switch (released out).

B. Internal Inspection

(1)Visually check condition of actuator (dents, oxidation, cleanliness, electrical connector correctly installed), control mechanism (safetying of bolts) and adjacent area (cleanliness, oxidation, cracks).
CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/ PANELS AT FR47.
(2)Close access door 147BZ.

C. External Inspection

(1)Visually check emergency ram air inlet flap :
- Flush fitting
- Clearance around flap : 3 mm ± 2 mm (0.118 in. ± 0.079 in.)
- Dents
- Protective finish.

(2)Check emergency ram air inlet adjacent area for cracks.

D. Close-Up

(1)Close main gear door (32-12-11, P. Block 301).
R (2)Install cooling air inlet 143AL (Ref. 53-15-73, P. Block 401).
R (3)Remove access platform.
R (4)Remove warning notice.

EMERGENCY RAM AIR INLET ACTUATOR (7HZ) - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.60 m (8 ft. 6 in.)
B.	Circuit Breaker Safety Clips
C.	Blanking Plugs/Caps
D.	Cotter Pin
Referenced Procedures	
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
- 21-53-00, P. Block 501	Emergency Ram Air Inlet

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
22VU	AIR BLEED/RAM AIR	2HZ	203/G16

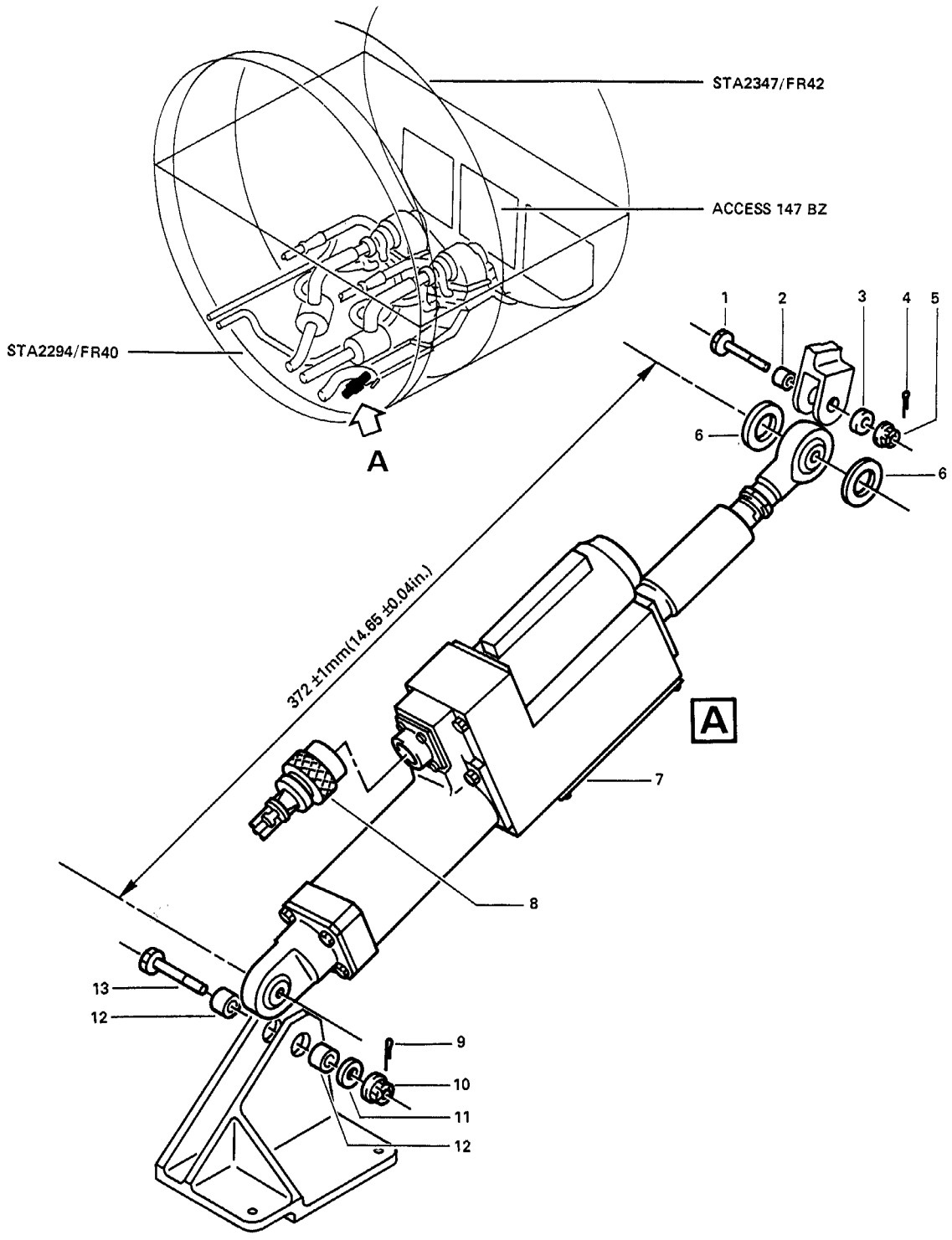
(2)Open main gear door (Ref. 32-12-11, P. Block 301).
(3)Position access platform.
(4)Remove air conditioning compartment access door 147BZ.

B. Removal

(1)Disconnect electrical connector (8).
(2)Remove cotter pin (4), nut (5) and washer (3).
(3)Remove cotter pin (9), nut (10) and washer (11).
(4)Hold actuator and remove bolt (1), washers (6) and bushing (2).
(5)Remove bolt (13) and bushings (12).
(6)Remove actuator (7).
(7)Cap electrical connector (8).

C. Installation

(1)Clean and inspect actuator interface and/or adjacent area (brackets, link rods).
(2)Remove blanking cap and check for correct condition of electrical connector (8).
(3)Check for correct condition of actuator attachment bolts and bushings.
R (4)Check that center-to-center distance of attaching holes of bracket and
R fork-end of actuator in retracted position is 372 ± 1 mm
R (14.65 ± 0.04 in.).
(5)Install actuator (7) in bracket and link rod fork ends.
(6)Install bushings (12) and bolt (13).
(7)Install bushing (2), washers (6) and bolt (1).
(8)Install washer (11), nut (10) ; tighten nut and install cotter pin (9).



Emergency Ram Air Inlet Actuator
Figure 401

R

(9)Install washer (3) and nut (5) ; tighten nut and install cotter pin (4).
(10)Connect electrical connector (8).
(11)Remove safety clip and tag and close circuit breaker 2HZ.

D. Test
Carry out operational test of emergency ram air inlet (Ref. 21-53-00, P. Block 501).

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/
R PANELS AT FR47.
(2)Install access door 147BZ.
(3)Close main gear door (Ref. 32-12-11, P. Block 301).
(4)Remove access platform.

EMERGENCY RAM AIR INLET CHECK VALVE (0038) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.60 m (8 ft. 6 in.)
B.	Torque Wrench 0.6 m.daN (53 lbf.in.)
C.	Blanking Plugs/Caps
D.	O-Rings
E.	Warning Notices

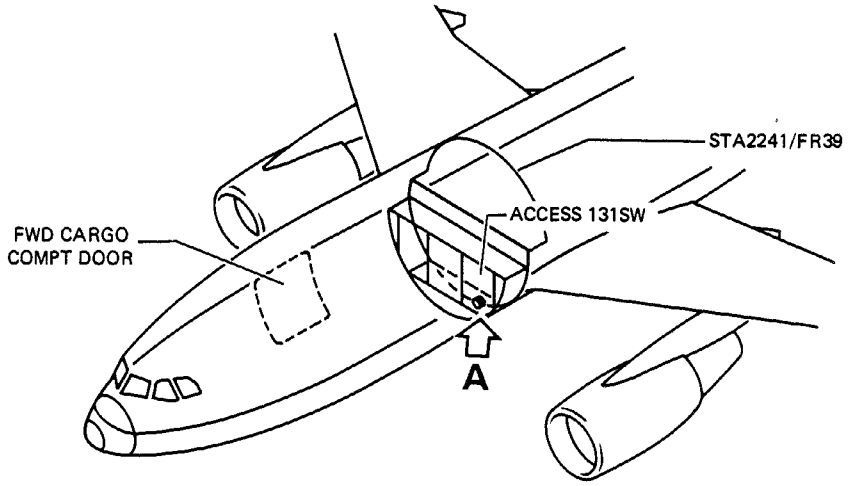
2. Procedure
(Ref. Fig. 401)

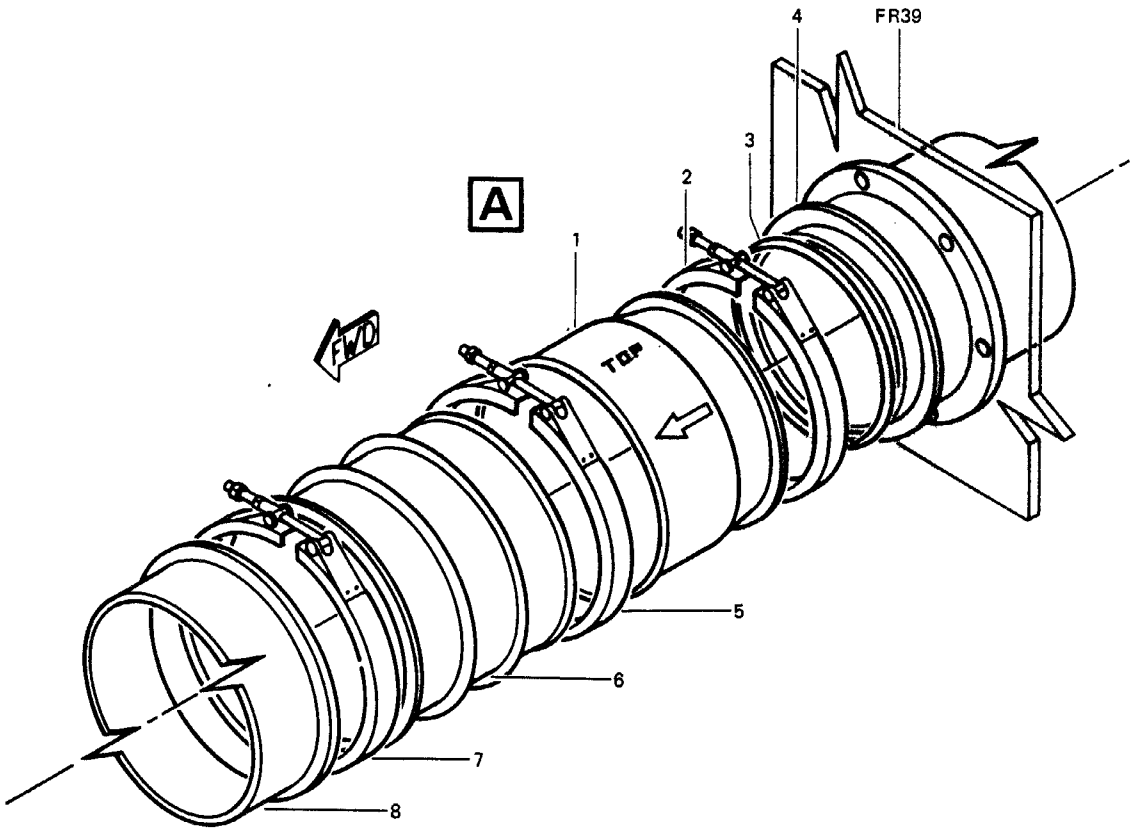
A. Job Set-Up
(1)Display warning notices prohibiting pressurization of pneumatic system.
(2)Position access platform at forward cargo compartment door and open door.
(3)Remove access door 131SW.

B. Removal
(1)Remove clamp (5) and loosen clamp (7). Slide flexible sleeve (6) onto duct (8).
(2)Loosen clamp (2).
(3)Hold valve (1) and remove clamp (2).
(4)Remove check valve (1) and discard O-ring (3).
(5)Cap open duct ends.

C. Installation
(1)Remove blanking caps.
(2)Clean and inspect valve interface and/or adjacent area.
(3)Check for correct condition of flexible sleeve (6) and FR39 bulkhead fitting (4) flange.
(4)Install new O-ring (3) in its groove in FR39 bulkhead fitting (4) flange.
(5)Install check valve (1) between flexible sleeve (6) and bulkhead fitting (4) with the arrow indicating airflow direction pointing forwards.
NOTE : A lug ensures correct angular positioning of check valve. (TOP marking located on valve upper part)
(6)Check that O-ring (3) is correctly installed in groove in bulkhead fitting (4) flange.
(7)Install clamp (2) and tighten nut. TORQUE to the value given on clamp.
(8)Install flexible sleeve (6), install clamp (5) and tighten clamps (5) and (7). TORQUE to value given on clamp.

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.





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Emergency Ram Air Inlet Check Valve
Figure 401

(2)Install access door 131SW.
(3)Close forward cargo compartment door and remove access platform.
(4)Remove warning notices.

EMERGENCY RAM AIR INLET CHECK VALVE (0038) - INSPECTION/CHECK

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Reason for the job
   To check for correct condition of emergency ram air inlet check valve.

2. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 21-53-12, P. Block 401	Emergency Ram Air Inlet Check Valve (0038)

3. Procedure

   A. Removal of check Valve (Ref. 21-53-12, P. Block 401).

   B. Check for correct condition of check valve : especially the two semi-circular flaps, hinge pin, tension spring ; check that check valve bears no traces of corrosion.
   Manually check that check valve operates correctly ; push flaps to make certain they can move to fully open or fully closed position.

   C. Install check valve (Ref. 21-53-12, P. Block 401).

R

1. General

Ventilation of the electric and electronic components is normally ensured by the air blowing system associated with the electronics racks air distribution system (Ref. 21-21-00) and the electronics racks air extraction system (Ref. 21-23-00). The purpose of the ground cooling system is to cool the air of the blowing system.

2. Component Location

(Ref. Fig. 001)

**ON A/C 001-005,

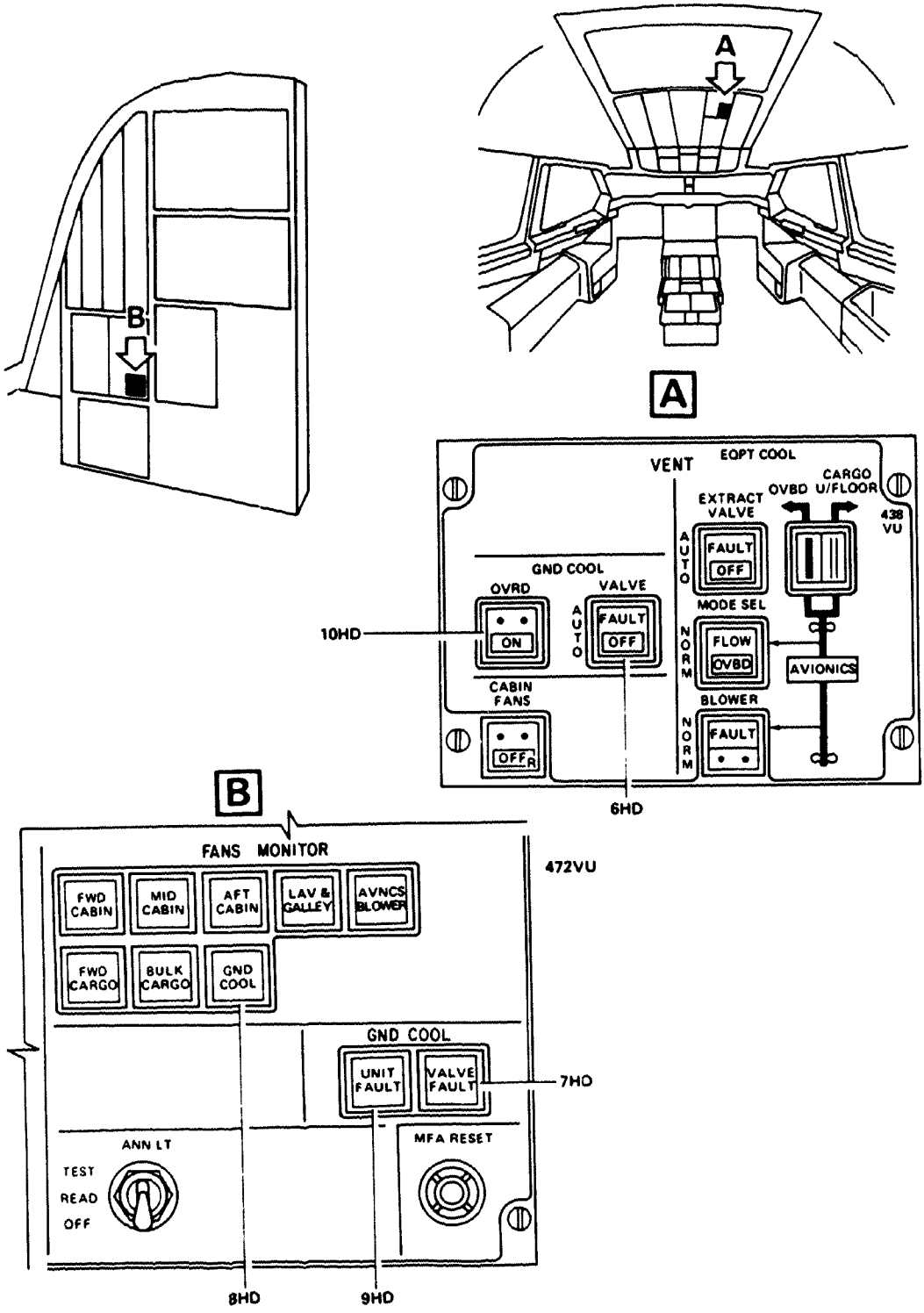
(Ref. Fig. 002)

**ON A/C 006-100,

(Ref. Fig. 003)

**ON A/C 001-100,

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
3HD	FAN-GROUND COOLING UNIT		121	121BL	21-55-12
6HD	P/BSW-GND COOL/CTL	438VU	212		21-55-00
7HD	MFA-GND COOL/VALVE FAULT	472VU	212		21-55-00
8HD	MFA-FANS MONITOR/GND COOL	472VU	212		21-55-00
9HD	MFA-GND COOL/UNIT FAULT	472VU	212		21-55-00
10HD	P/BSW-GND COOL/PACK OVRD	438VU	212		21-55-00
18HD	DETECTOR-AIR FLOW GROUND COOLING		121	121BL 121BL	21-55-14
21HD	COOLING UNIT-GROUND		121	131AZ	21-55-11
22HD	VALVE-GROUND COOLING		121	121BL	21-55-13



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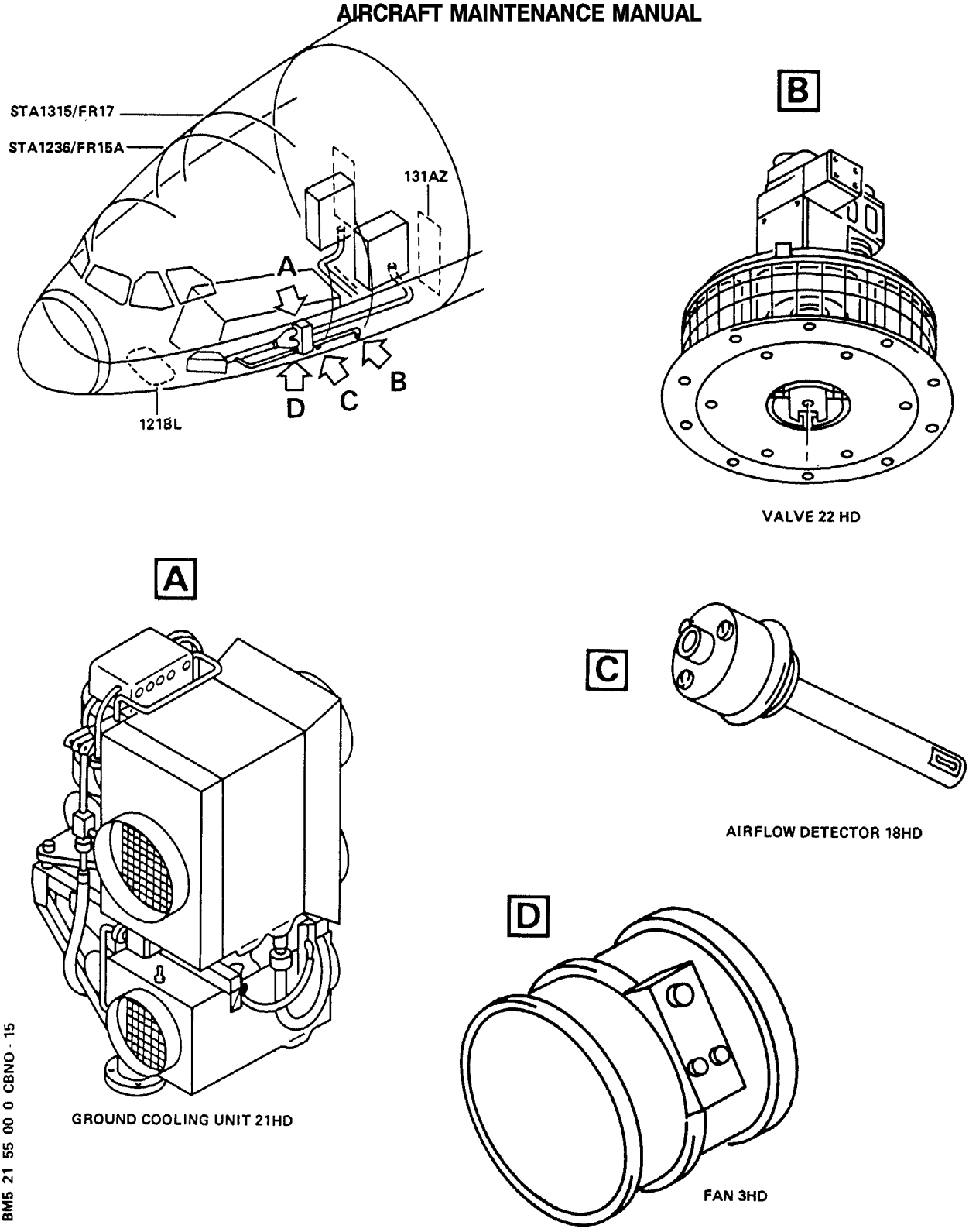
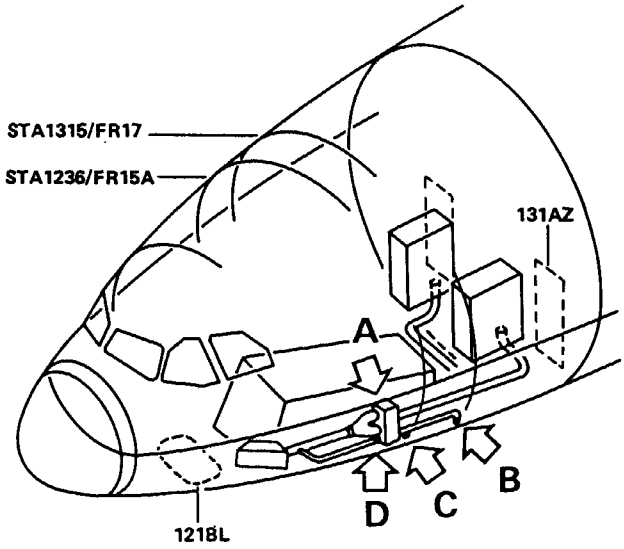
Ground Cooling - Controls and Indicating
Figure 001



Ground Cooling - Component Location
Figure 002



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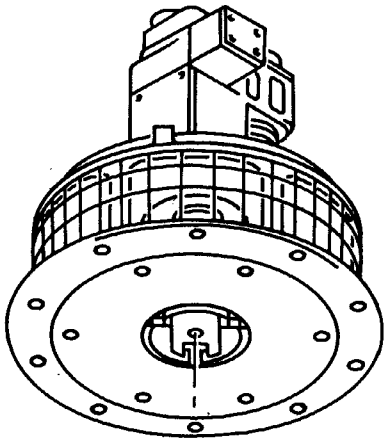
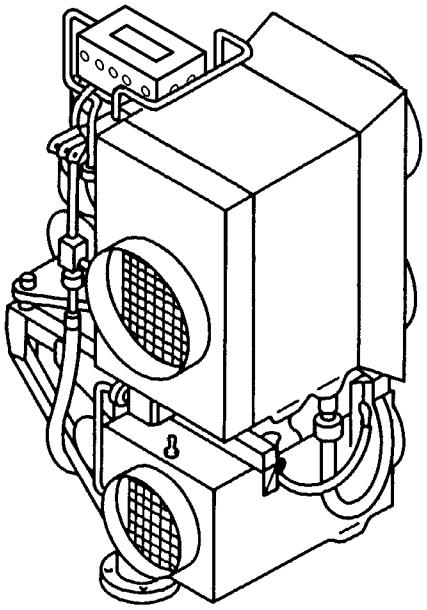


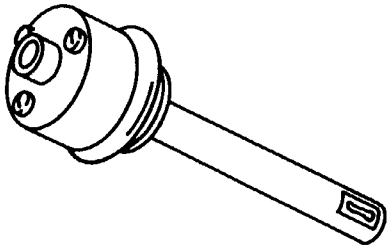
VALVE 22 HD

A



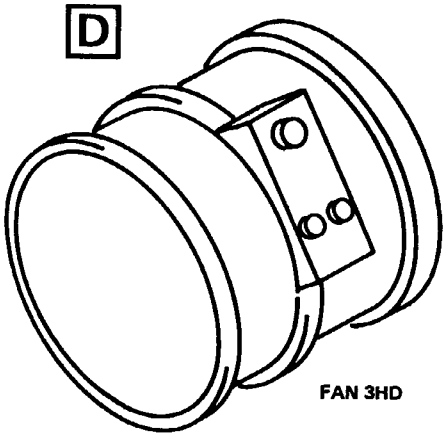
GROUND COOLING UNIT 21HD

C



AIRFLOW DETECTOR 18HD

D



FAN 3HD

BM5 21 55 00 0 CBP0 00

Ground Cooling - Component Location
Figure 003

R

3. Description
(Ref. Fig. 004)

A. Air Cooling
The air ventilating the electronics racks (blowing system) is cooled on the ground by a ground cooling unit associated with a fan and a valve, which provides overboard discharge of the cooling airflow.

B. Controls and Indicating
(Ref. Fig. 005)
(Ref. Fig. 006)

C. Ground Warning
(Ref. Fig. 007)

D. Central Warnings
Illumination of **FAULT** legend on **GND COOL/CTL** pushbutton switch is accompanied by :
- activation of the single chime aural warning
- illumination of **MASTER CAUTION** lights on **CAPT** and **F/O** main instrument panels **3VU** and **5VU**
- message display on the left **ECAM** display unit (Ref. 31-51-00).

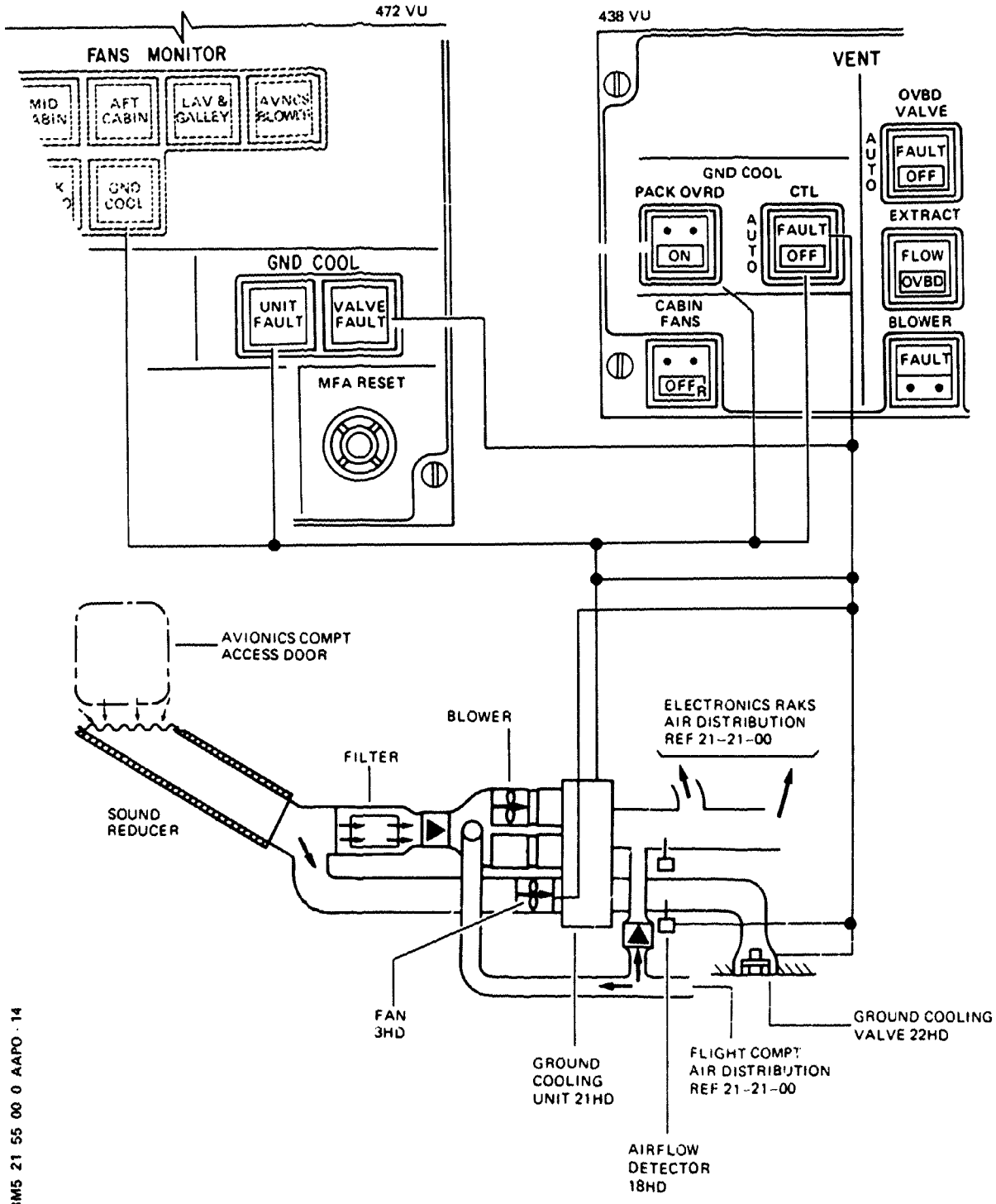
4. Component Description

A. Ground Cooling Unit 21HD
(Ref. Fig. 008)

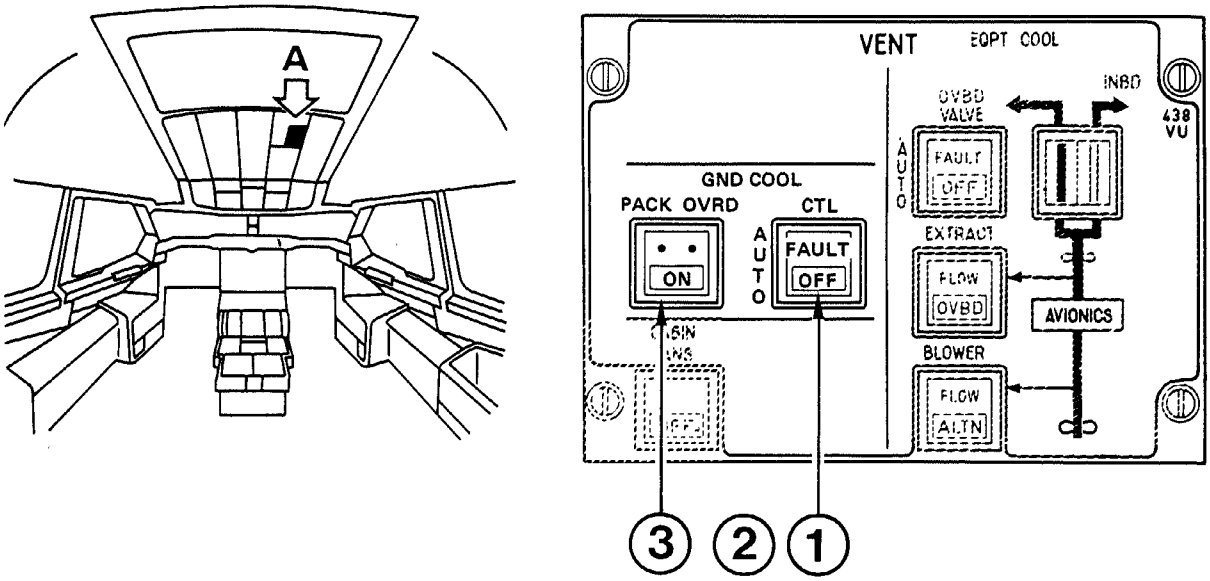
(1)General
The ground cooling unit serves to cool the air of the blowing system on the ground whether or not air conditioning system is in operation.

(2)Description
The cooling unit is of the freon type and is made of the following components :
- an evaporator which causes the freon to evaporate at low pressure i.e. at low temperature and therefore provides cooling of the airflow.
- a compressor (C) which compresses the gaseous freon so as to increase the pressure and temperature
- an oil separator (D) which enables oil to remain in the compressor casing,
- a condenser which serves to cool and condense the gaseous freon
- a reservoir (R) which enables optimization of the mass flow with respect to the various temperatures and allows for permissible leakage
- a filter dryer (Fd) which eliminates water and foreign matters from the freon charge
- a sight-glass (V) which enables checking of the quality of the freon charge
- a thermostatic valve (VT) which provides an isenthalpic detent which gives the desired evaporation temperature and correct refrigerating power.

(3)Operation
The operation of the ground cooling unit is automatically controlled by



Ground Cooling - Airflow Diagram
Figure 004



1 GND COOL/CTL PUSHBUTTON SWITCH SERVES TO CONTROL GROUND COOLING UNIT.
(NORMAL OPERATION OF UNIT WITH PACK OVRD PUSHBUTTON SWITCH RELEASED (OUT), ON LEGEND OFF).

– PUSHBUTTON SWITCH PRESSED (IN) (AUTO CONFIGURATION) :
- START-UP OF GROUND COOLING UNIT WITH REFRIGERATION UNIT PACKS SHUTDOWN OR APU BLEED OFF AND ENGINES SHUT DOWN, IF BLOWING AIR TEMPERATURE IS TOO HIGH.

NOTE : START-UP OF GROUND COOLING UNIT IS INITIATED AFTER FULL OPENING OF GROUND COOLING VALVE AND START-UP OF GROUND COOLING FAN.

- SHUTDOWN OF GROUND COOLING UNIT AT START-UP OF ONE REFRIGERATION UNIT PACK (1 OR 2) OR OPENING OF APU BLEED (APU RPM≥95%) OR START UP OF ONE ENGINE

– PUSHBUTTON SWITCH RELEASED (OUT) (OFF WHITE LEGEND ON) :
SHUTDOWN OF GROUND COOLING UNIT.

NOTE : AT GROUND COOLING UNIT SHUTDOWN, FAN STOPS AND VALVE CLOSES.

2 FAULT LEGEND COMES ON AMBER IN THE EVENT OF FAILURE OF FAN, VALVE (LOCKED IN EITHER OPEN OR CLOSED POSITION) OR GROUND COOLING UNIT (MEMORIZED FAULT ANNUNCIATORS (MFAs) ON MAINTENANCE PANEL SERVE TO INDENTIFY FAULTY COMPONENTS).

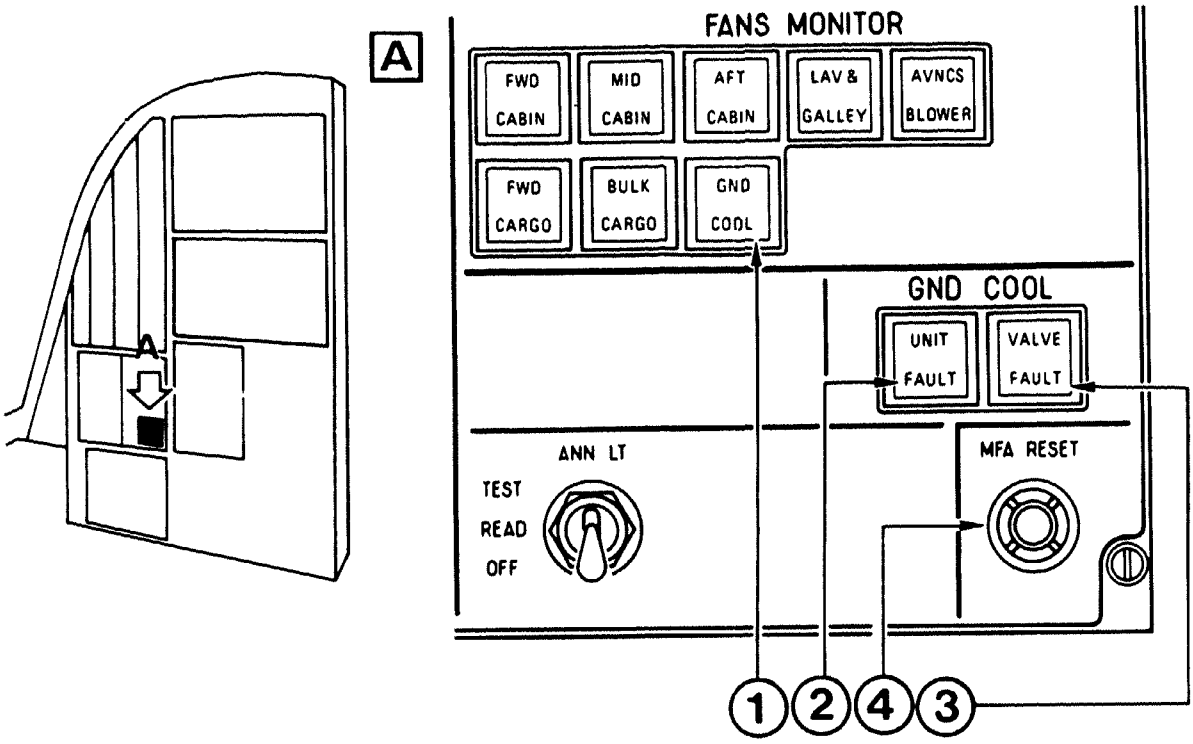
3 PACK OVRD PUSHBUTTON SWITCH SERVES TO OVERRIDE REFRIGERATION UNIT PACK CONNECTION ON THE GROUND UNDER VERY HOT WEATHER CONDITIONS.

– PUSHBUTTON SWITCH RELEASED (OUT) :
AUTOMATIC NORMAL OPERATION OF GROUND COOLING UNIT.

– PUSHBUTTON SWITCH PRESSED (IN) (ON WHITE LEGEND ON) : OPERATION OF GROUND COOLING UNIT EVEN WITH REFRIGERATION UNIT PACKS OPERATING (SHUTDOWN OF GROUND COOLING UNIT AT START-UP OF ONE ENGINE).

BM5 21 55 00 0 ACPO - 15

VENT Section 438VU of Overhead Panel
Figure 005



NOTE MFAs COME ON ONLY WHEN ANN LT SWITCH IS IN READ POSITION

1 GND COOL MEMORIZED FAULT ANNUNCIATOR (MFA)
COMES ON AND MEMORIZES GROUND COOLING FAN FAULTY OPERATION

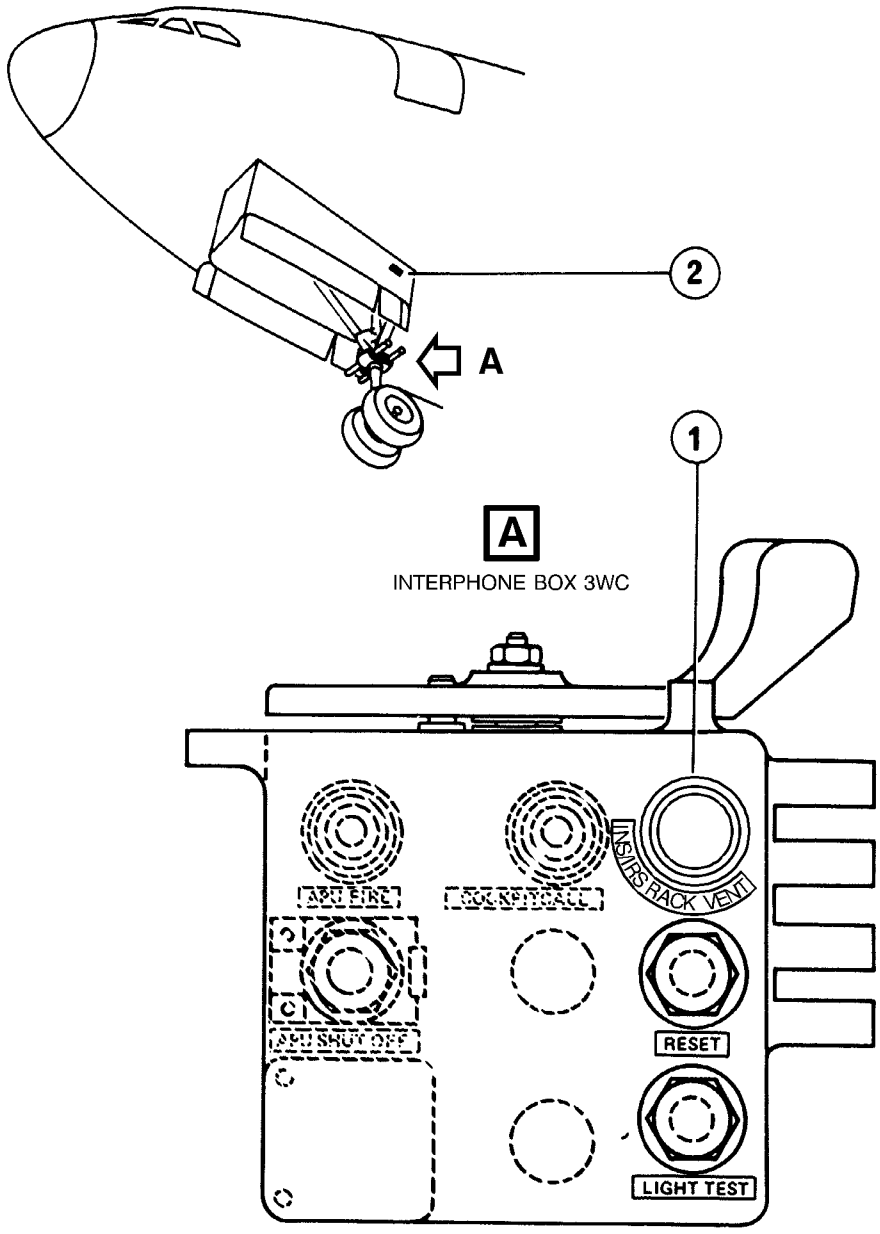
2 UNIT FAULT MFA
COMES ON AND MEMORIZES GROUND COOLING UNIT FAULTY OPERATION

3 VALVE FAULT MFA
COMES ON AND MEMORIZES GROUND COOLING VALVE FAULTY OPERATION (VALVE LOCKED IN EITHER OPEN OR CLOSED POSITION).

4 MFA RESET PUSHBUTTON SWITCH :
- SERVES TO UNLATCH MFAs AFTER FAULTS HAVE DISAPPEARED

BM5 21 55 00 0 AEPO. 14

FANS MONITOR Section of Maintenance Panel 472VU
Figure 006

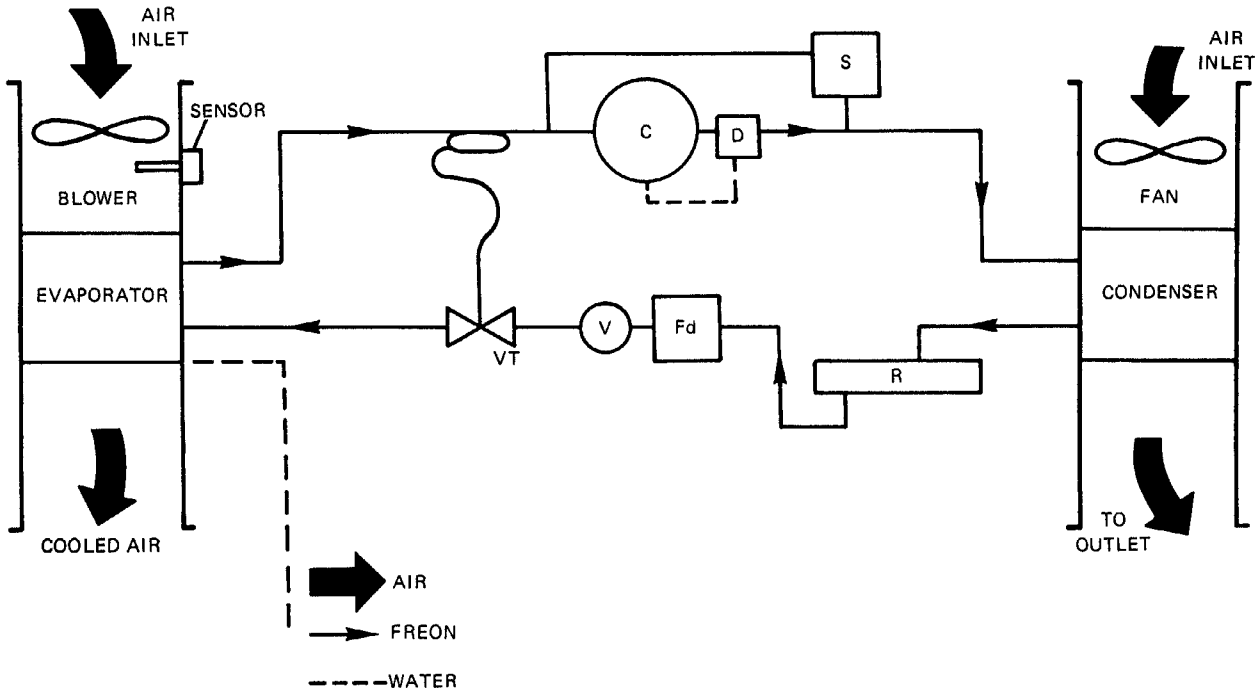


BM5 21 55 00 0 AFM0 08

1. INS/IRS RACK VENT WARNING LIGHT:
   - COMES ON IN THE EVENT OF FAILURE OF GROUND COOLING FAN, VALVE OR UNIT (ILLUMINATION OF FAULT LEGEND ON GND COOL/CTL PUSHBUTTON SWITCH IN FLIGHT COMPARTMENT).

2. MECHANIC CALL HORN 4WC:
   - ACTIVATED IN THE SAME CONDITIONS AS THE INS/IRS RACK VENT WARNING LIGHT.

Ground Warning
Figure 007



BM5 21 55 00 0 AHMO - 00

Ground Cooling Unit - Schematic
Figure 008

a sensor. The sensor detects the temperature of the air to be cooled upstream of the evaporator ; the sensor controls :
- start-up of the ground cooling unit when the air temperature is 27°C (80.6°F)
- Shutdown of the ground cooling unit when the air temperature is 24°C (75.2°F) approximately.

(4)Safety system

In the event of failure, a safety system controls the automatic shutdown of the cooling unit and provides indication via magnetic indicators located on the unit :
- magnetic indicator displays green : normal operation
- magnetic indicator displays red : failure.

Automatic shutdown occurs in the following cases :
- the freon pressure too high. This fault is indicated by the **HP** magnetic indicator
- the freon pressure too low. This fault is indicated by the **LP** magnetic indicator
- excessive charging ; this fault is indicated by the **THERM SWITCH** magnetic indicator
- opening of the sensor electrical circuit. This fault is indicated by the **TEMP SENSOR** magnetic indicator.

A TEST pushbutton switch enables checking of the safety system, the magnetic indicators display all faults.
Upon completion of test, the safety system must be reset by pressing the **RESET** pushbutton switch

NOTE : If an **HP** fault is indicated, the **GCU** should remain off for at least 20 minutes before it is reset.
In the case of **GND COOL FAULT ECAM** warning (with tripping of the **HP** magnetic indicator), the **GCU** should not be considered defective if there is no **GCU** fan failure and the outside air temperature **(OAT)** exceeds 48°C.

**ON A/C 006-100,

NOTE : Pressing the **RESET** pushbutton switch only causes the magnetic indicators located on the unit to be reset.

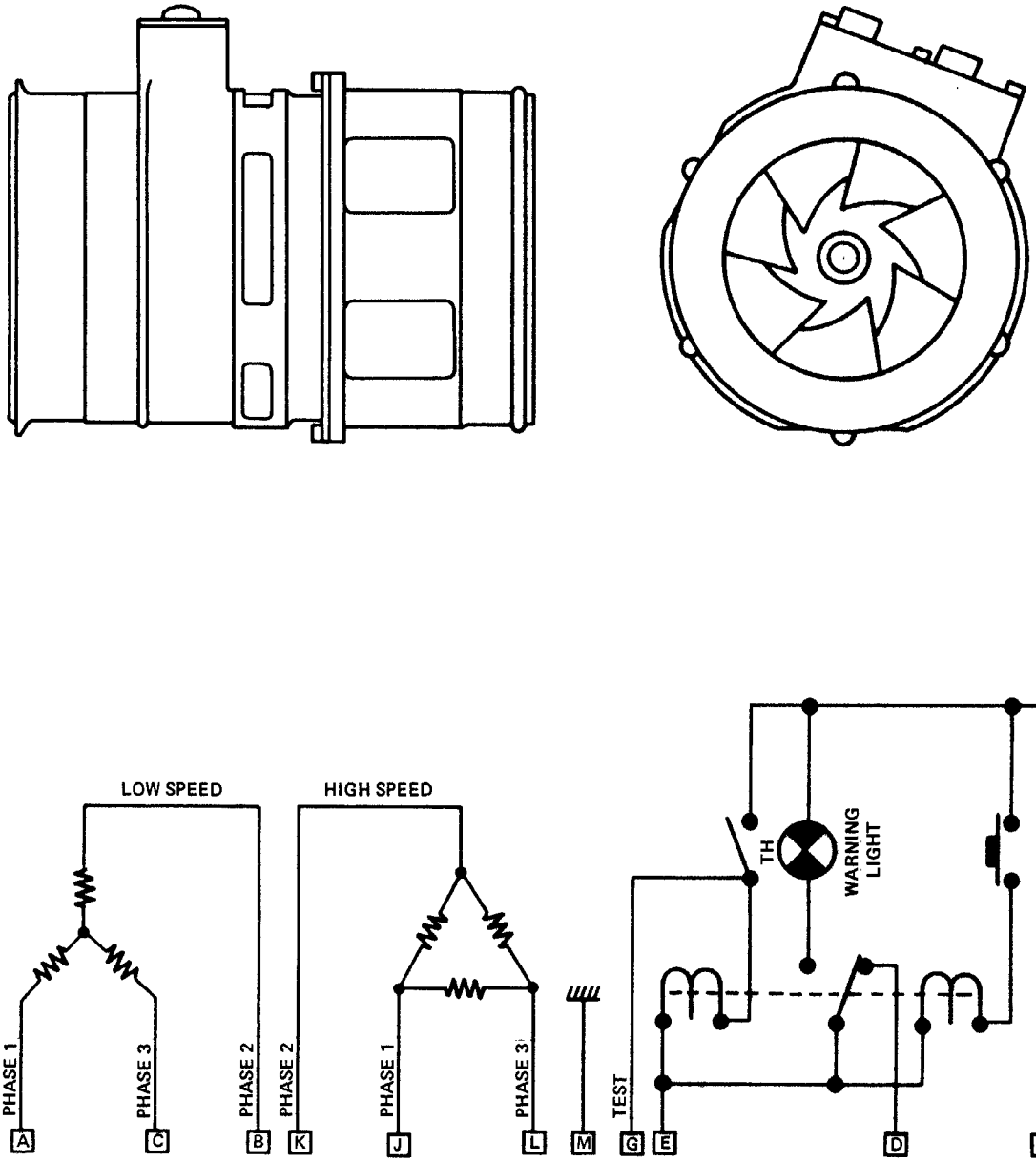
R **ON A/C 001-100,

B. Ground Cooling Fan **3HD**

(Ref. Fig. 009)

The operation of the fan is directly associated with that of the cooling unit ; the fan serves to cool the condenser of the cooling unit.
The fan is of the axial-type driven by a **115VAC** electric motor.
The fan is equipped with a protection system which causes the fan to stop in the event of overheat.

NOTE : The pushbutton switch and warning light located on the fan body are only used to test the fan on a workshop test bench, when fan is removed from aircraft.



BM5 21 55 00 0 AJPO - 15

Ground Cooling Fan 3HD
Figure 009

C. Ground Cooling Valve 22HD
(Ref. Fig. 010)
The valve provides outboard discharge of the cooling airflow. Valve operation is function of ground cooling unit configuration and is controlled by an electric motor and actuator ; the actuator transforms the rotational movement of the motor into linear movement to open or close the valve. The full opening and full closing positions of the valve are obtained by cutting off power supply to the motor via two microswitches. The valve is provided with a manual control which enables closure or opening of the valve in the event of motor failure. The manual control handle is normally locked in flush position ; pressing the pushbutton switch identified PUSH causes unlocking of the handle.

D. Airflow Detector 18HD
(Ref. Fig. 011)
The airflow detector is installed in the cooling air system of ground cooling unit 21HD, downstream of fan 3HD.
The airflow detector serves to :
- control start-up of the cooling unit if the cooling airflow is sufficient (fan 3HD operating)
- control shutdown of the cooling unit and activation of warnings if insufficient cooling airflow is detected for a period equal to or longer than 3 minutes.

Detection is made by a thermistor cooled by the airflow.

5. Operation

**ON A/C 001-005,

(Ref. Fig. 012)

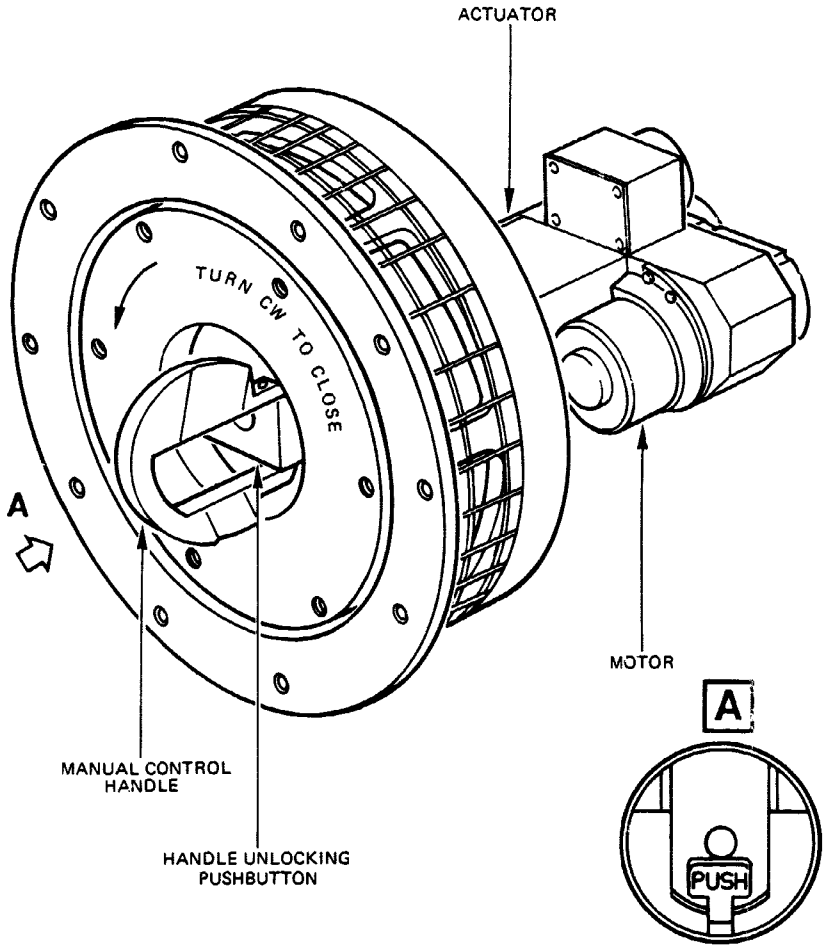
**ON A/C 006-100,

(Ref. Fig. 013)

R **ON A/C 001-100,

A. Operation in Automatic Mode
(GND COOL/CTL Pushbutton Switch 6HD Pressed (in) and PACK OVRD Pushbutton Switch 10HD Released (out)
(1)Ground cooling activation
On the ground, at shutdown of refrigeration unit packs 1 and 2 or APU air bleed and engines 1 and 2 :
- ground cooling valve 22HD opens
- ground cooling fan 3HD starts operating (when the valve is fully open).

When these conditions are met, the ground cooling unit starts up or shuts down automatically, depending on the temperature of the air :
- ground cooling unit starts up when temperature is 27°C (80.6°F) approximately
- ground cooling unit shuts down when temperature is 24°C (75.2°F)



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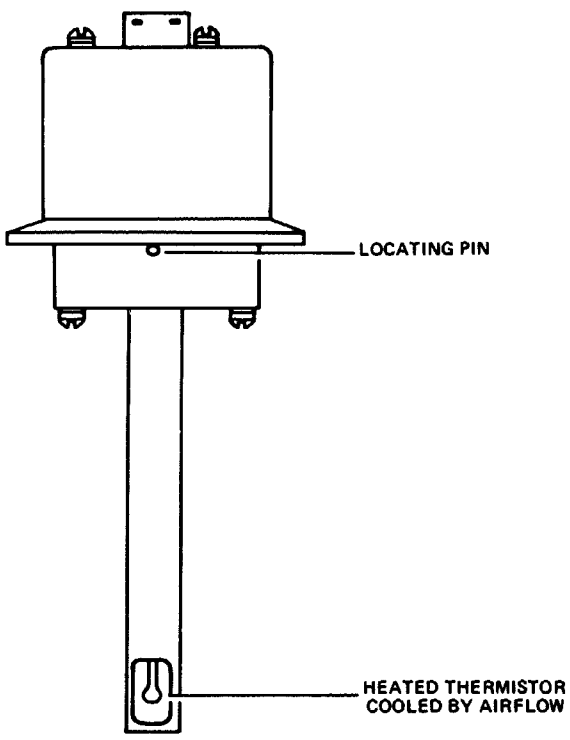
Ground Cooling Valve
Figure 010



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Airflow Detector 18HD
Figure 011

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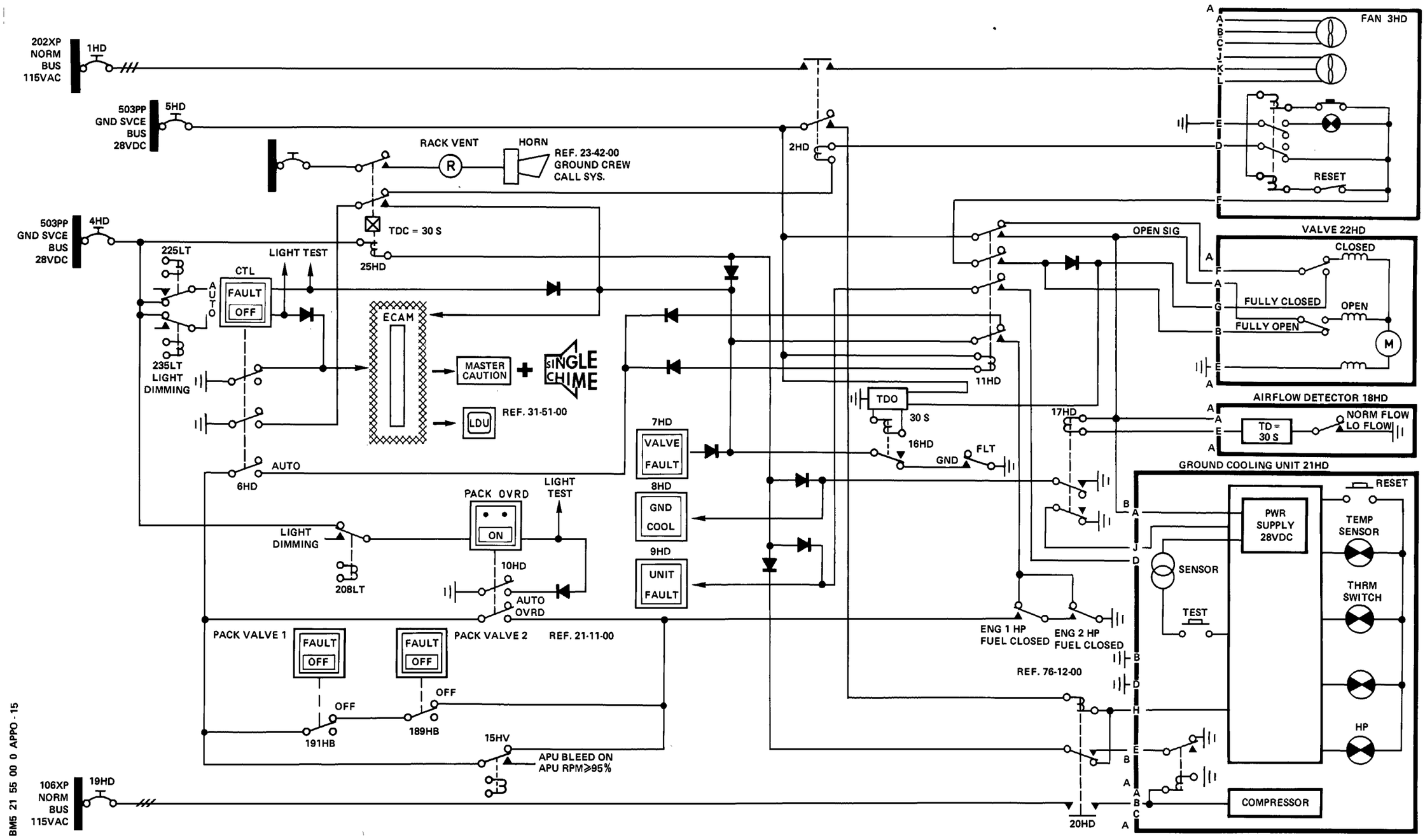
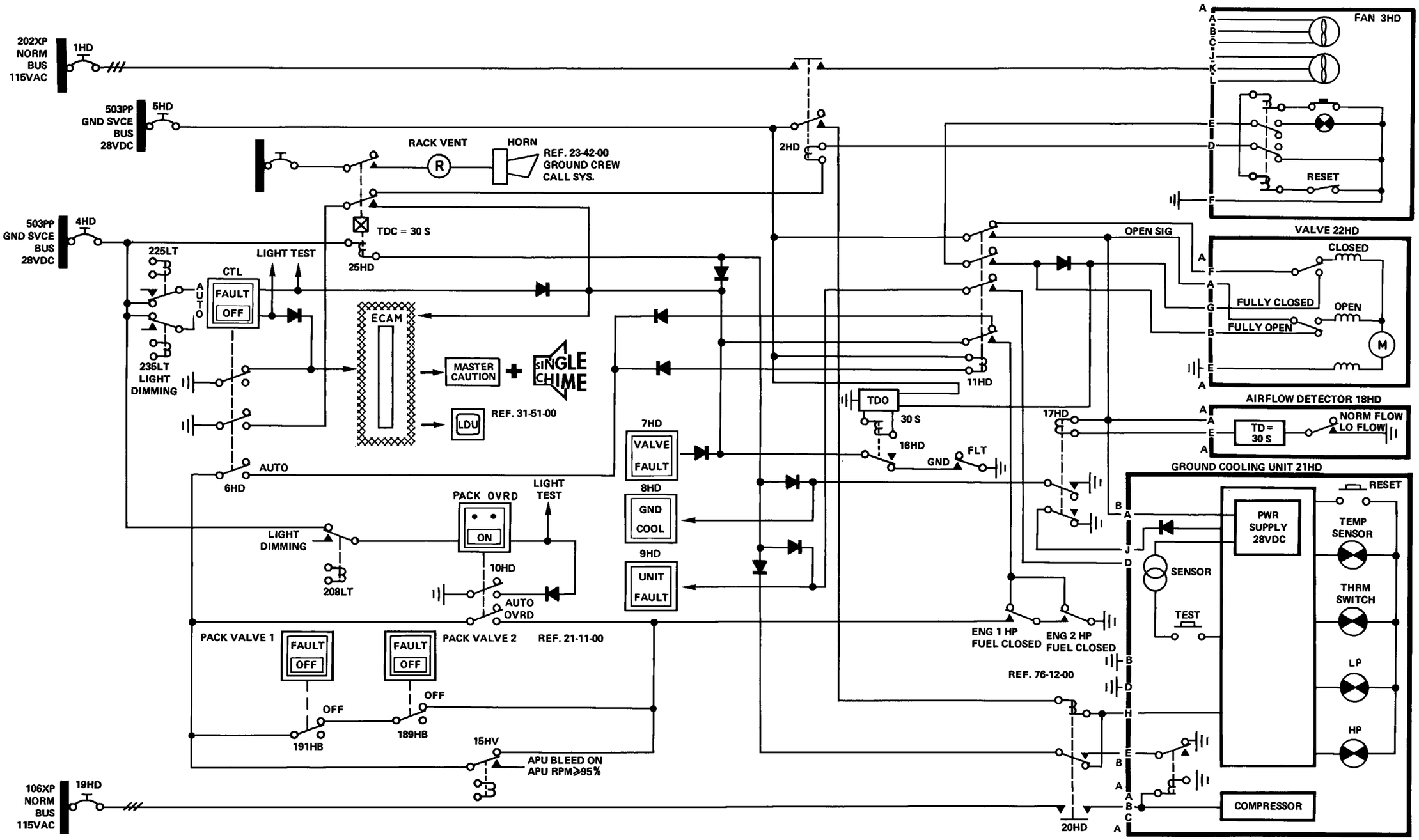


Ground Cooling - Schematic
Figure 012



BM5 21 55 00 0 APV0 00

Ground Cooling - Schematic
Figure 013

R

approximately.
Ground cooling unit operation is controlled by safety and control components integrated in the unit.

(2) Ground cooling deactivation
Start-up of refrigeration unit pack 1 or 2 opening of APU air bleed (APU N≥ 95 %) or start-up of engine 1 or 2 causes :
- ground cooling unit shutdown
- fan to stop
- valve closure.

B. Operation in Override Mode (OVRD)
(PACK OVRD Pushbutton Switch 10HD Pressed(In), ON Legend On)
Operation in override mode is identical to that in automatic mode except that the ground cooling unit can operate even with the refrigeration unit packs in operation. The ground cooling unit shuts down at start-up of the two engines.

C. Safety
In order to prevent ground cooling valve untimely opening command in flight the bar supplying the ground cooling control system is shed in flight (Ref.24-54-00).

1. Operational Test

A. Reason for the Job

R Operational check of electronics racks ground cooling system FAULT warning.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure

(1)Job set-up

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED, AND ON VENT PANEL 438VU MAKE CERTAIN THAT GND COOL/CTL PUSHBUTTON SWITCH IS RELEASED (OUT).

(a)Circuit breakers closed, particulary those associated with VENTILATION.
(b)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Make certain that electronics racks ventilation is correct.
(d)On panel 9VU
- Make certain that ENG1 and ENG2 HP fuel shutoff valve control levers are in OFF position.

(e)On VENT panel 438VU
- GND COOL/PACK OVRD pushbutton switch is pressed (in) (ON legend on)
- OFF legend of GND COOL/CTL pushbutton switch is on.

(f)On maintenance panel 472 VU
- place ANN LT switch in READ position.

(2)Test

ACTION	RESULT
1. On VENT panel 438VU - press GND COOL/CTL pushbutton switch	On VENT panel 438VU - OFF legend of GND COOL/CTL pushbutton switch goes off. Ground cooling valve opens (opening time = 10 seconds). - fan operates.
2. On circuit breaker panel 131VU - open VENTILATION/GND COOL/FAN circuit breaker 1HD	- fan 3HD stops operating. After 30 seconds approx. On maintenance panel 472VU - GND COOL MFA comes on. After 1 minute approx. On VENT panel 438VU - FAULT legend of GND COOL/CTL

ACTION	RESULT
	pushbutton switch comes on In nose landing gear well - horn is activated. NOTE : Switch off horn using **RESET** pushbutton switch on interphone box located in nose landing gear well as soon as horn is activated.
3. On **VENT** panel **438VU** - release **GND COOL/CTL** pushbutton switch	On **VENT** panel **438VU** - **FAULT** legend of **GND COOL/CTL** pushbutton switch goes off - **OFF** legend of **GND COOL/CTL** pushbutton switch comes on Ground cooling valve closes.
4. On maintenance panel **472VU** - press **MFA RESET** pushbutton switch	On maintenance panel **472VU** - **GND COOL MFA** goes off.
5. On circuit breaker panel **131VU** - close **VENTILATION/GND COOL/FAN** circuit breaker **1HD**	No change
6. On **VENT** panel **438VU** - press **GND COOL/CTL** pushbutton switch	On **VENT** panel **438VU** - **OFF** legend of **GND COOL/CTL** pushbutton switch goes off. Ground cooling valve opens (opening time = 10 seconds). - fan operates.

(3)Close-up
(a)On maintenance panel **472VU**
- place **ANN LT** switch in **OFF** position.
(b)Close access door **121BL**.
(c)Restore system and aircraft to normal operating condition.
(d)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

R

1. Equipment and Materials

ITEM	DESIGNATION
A.	Torque Wrench 0.6 m.daN (53 lbf.in)
B.	Blanking Plugs/Caps
C.	O-Ring
D.	Circuit Breaker Safety Clips

2. Procedure

**ON A/C 001-005,

(Ref. Fig. 401)

**ON A/C 006-100,

(Ref. Fig. 402)

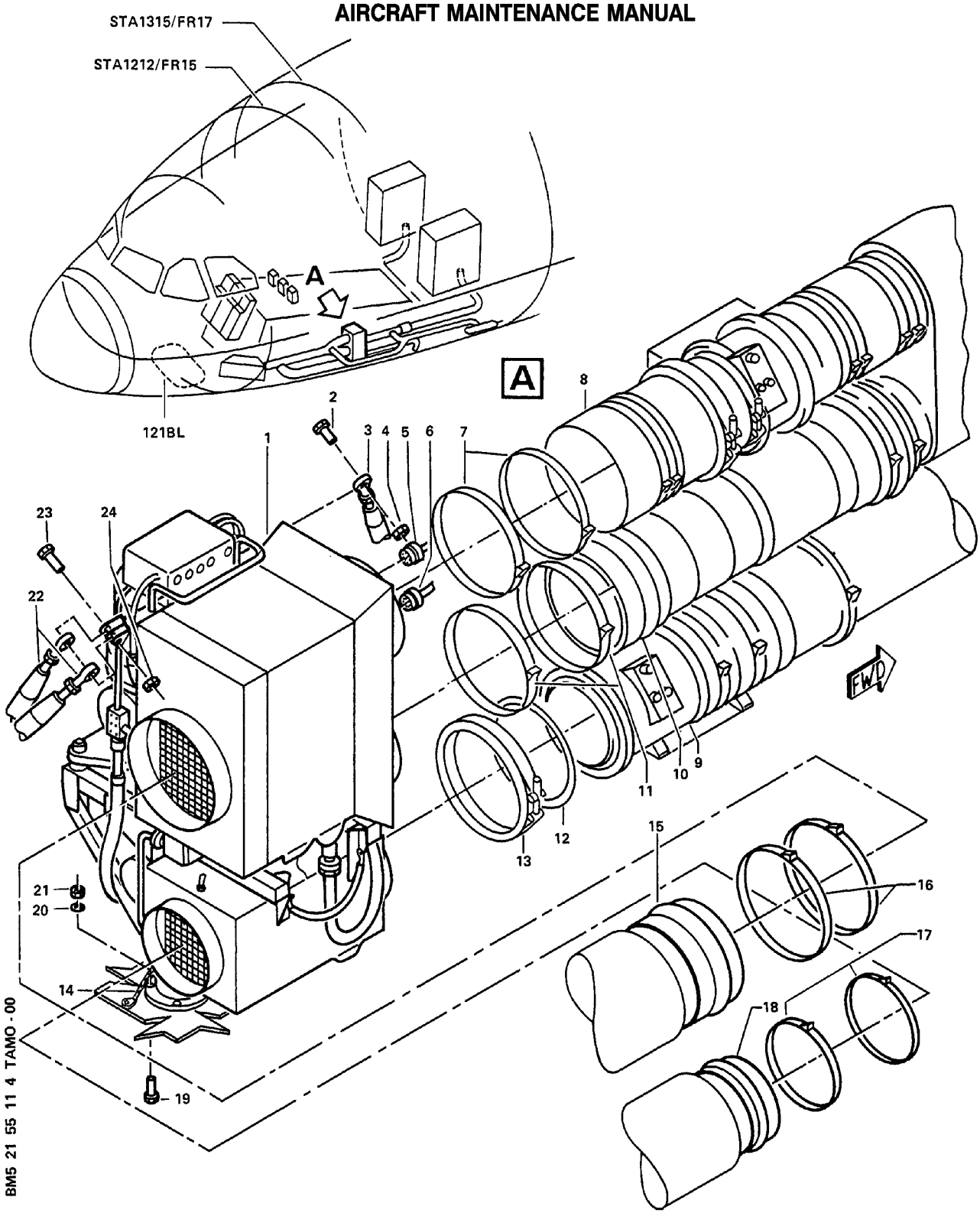
**ON A/C 001-100,

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

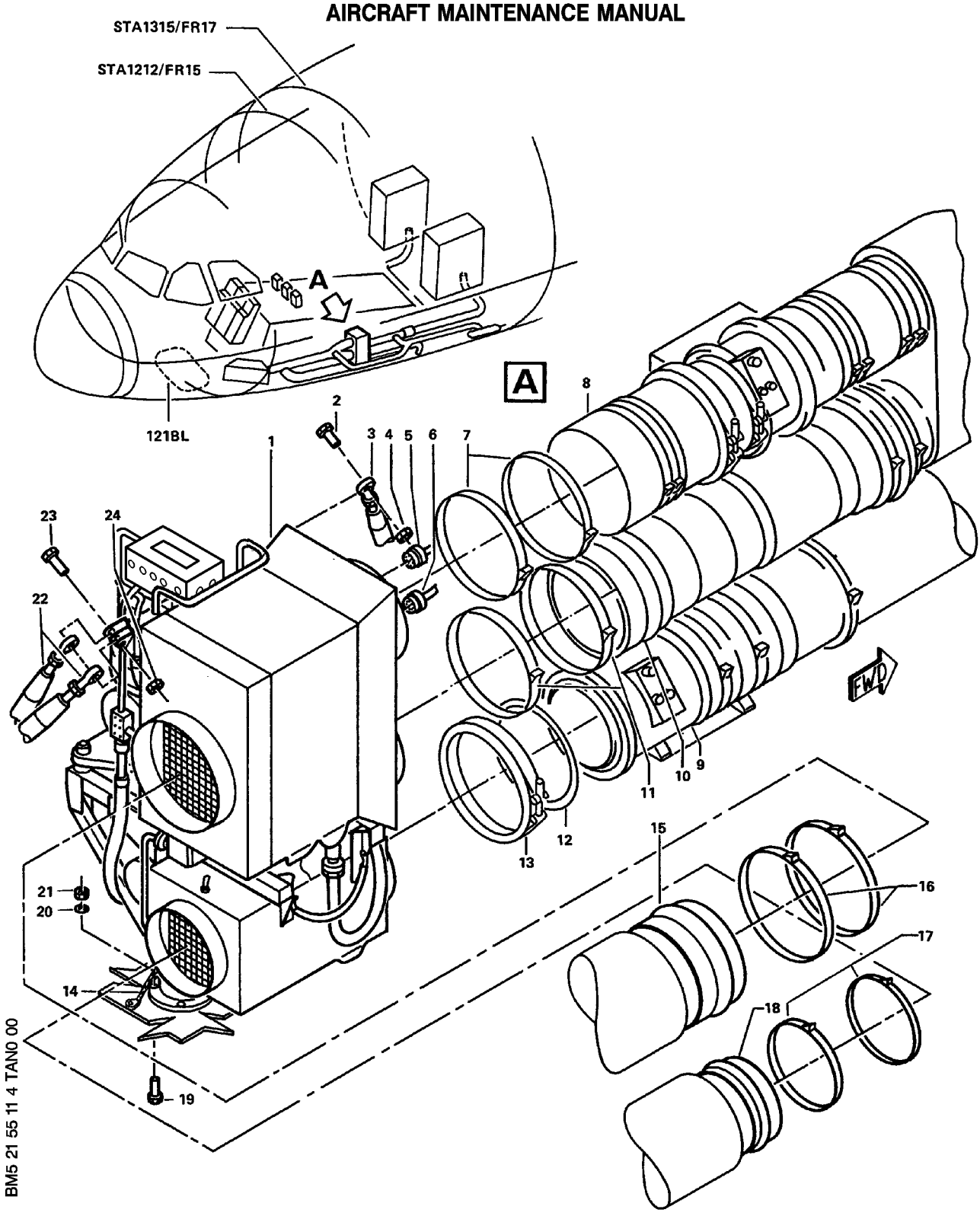
PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILATION/GND COOL/WARN	4HD	311/H61
131VU	VENTILATION/GND COOL/CTL	5HD	311/H62
131VU	VENTILATION/GND COOL/FAN	1HD	312/G64
131VU	VENTILATION/GND COOL/UNIT	19HD	314/E64

(2)Open access door 131AZ.

B. Removal
(1)Disconnect electrical connectors (6) and (5).
(2)Disconnect bonding strip (14).
(3)Remove the two clamps (16) from flexible sleeve (15). Slide flexible sleeve onto duct to free ground cooling unit.
(4)Remove the two clamps (17) from flexible sleeve (18). Slide flexible sleeve onto duct to free ground cooling unit.
(5)Remove the two clamps (7) from flexible sleeve (8). Slide flexible sleeve onto duct to free ground cooling unit.
(6)Remove the two clamps (11) from flexible sleeve (10). Slide flexible sleeve onto duct to free ground cooling unit.
(7)Remove clamp (13).
(8)Remove the eight bolts (19), nuts (21) and washers (20).
(9)Remove bolt (23) and nut (24) and free rods (22).



Ground Cooling Unit
Figure 401



Ground Cooling Unit
Figure 402

(10)Remove bolt (2) and nut (4) and free rod (3).
(11)Remove ground cooling unit (1).
(12)Remove and discard O-ring (12) from fan (9).
(13)Cap open duct ends and electrical connectors (6) and (5).

C. Installation
(1)Remove blanking plugs/caps and check condition of duct and fan (9) flanges, flexible sleeves and electrical connectors.
(2)Clean and inspect ground cooling unit interface and/or adjacent area.
(3)Install new O-ring (12) in its groove on fan (9) flange.
(4)Install ground cooling unit (1) between ducts.
(5)Install the eight bolts (19), washers (20) and nuts (21).
(6)Position rods (22) and install bolt (23) and nut (24).
(7)Position rod (3) and install bolt (2) and nut (4).
(8)Install clamp (13) ; TORQUE nut to value given on clamp.
(9)Install flexible sleeve (10) ; install and tighten the two clamps (11).
(10)Install flexible sleeve (8) ; install and tighten the two clamps (7).
(11)Install flexible sleeve (18) ; install and tighten the two clamps (17).
(12)Install flexible sleeve (15) ; install and tighten the two clamps (16).
(13)Connect bonding strip (14).
(14)Connect electrical connectors (6) and (5).

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 131AZ.
(3)Remove safety clips and tags and close circuit breakers 1HD, 19HD, 5HD and 4HD.

**ON A/C 006-100,

3. Removal/Installation of Electronic Control Box

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Blanking Plugs/Caps
(2)	Circuit Breaker Safety Clips

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

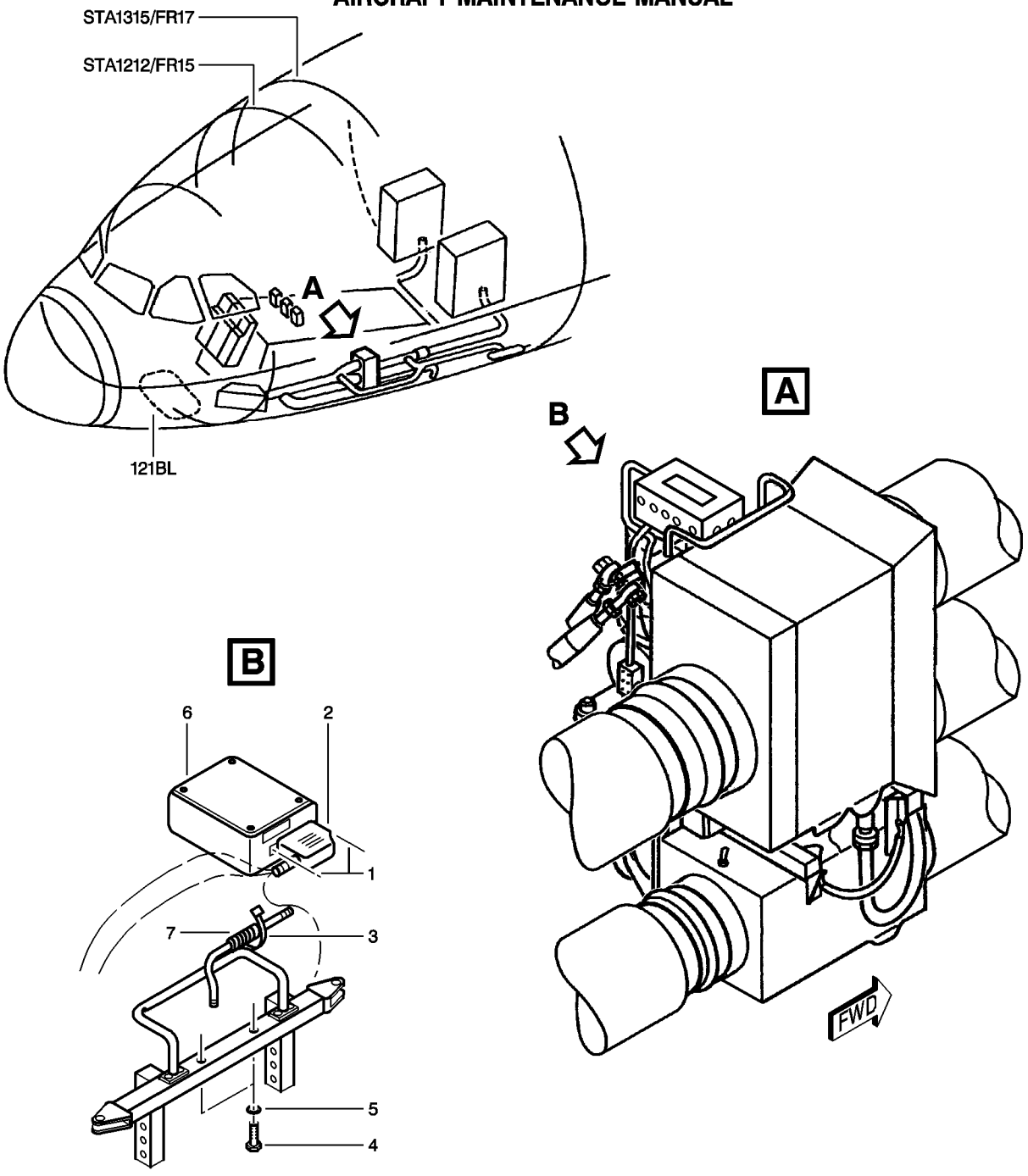
PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILATION/GND COOL/WARN	4HD	311/H61
131VU	VENTILATION/GND COOL/CTL	5HD	311/H62
131VU	VENTILATION/GND COOL/FAN	1HD	312/G64
131VU	VENTILATION/GND COOL/UNIT	19HD	314/E64

(2)Open access door 131AZ.

B. Removal
(Ref. Fig. 403)
(1)Unscrew the two locking kits (1) then disconnect the electrical connector (2).
(2)Install cap on electrical connector.
(3)Cut the strap (3).
(4)Remove the two screws (4) and washers (5).
(5)Remove electronic control box (6).

C. Installation
(1)Position the electronic control box (6) on the structure.
(2)Install the two screws (4) and washers (5).
(3)Protect the part of the compressor electrical cable (7) that will be in contact with its support on electronic control box with adhesive tape.
(4)Attach the compressor electrical cable (7) to the support with a strap (3).
(5)Remove cap on electrical connector.
(6)Connect the electrical connector (2) then lock the electrical connector with the two locking kits (1).

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 131AZ.
(3)Remove safety clips and tags and close circuit breakers 1HD, 19HD, 5HD and 4HD.



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Electronic Control Box
Figure 403

R

R

1. Equipment and Materials

ITEM	DESIGNATION
A.	Torque Wrench 0.6 m.daN (53 lbf. in.)
B.	Blanking Plugs/Caps
C.	O-Ring
D.	Circuit Breaker Safety Clips
Referenced Procedure - 21-55-00, P. Block 501	Ground Cooling

2. Procedure

**ON A/C 001-005,

(Ref. Fig. 401)

**ON A/C 006-100,

(Ref. Fig. 402)

**ON A/C 001-100,

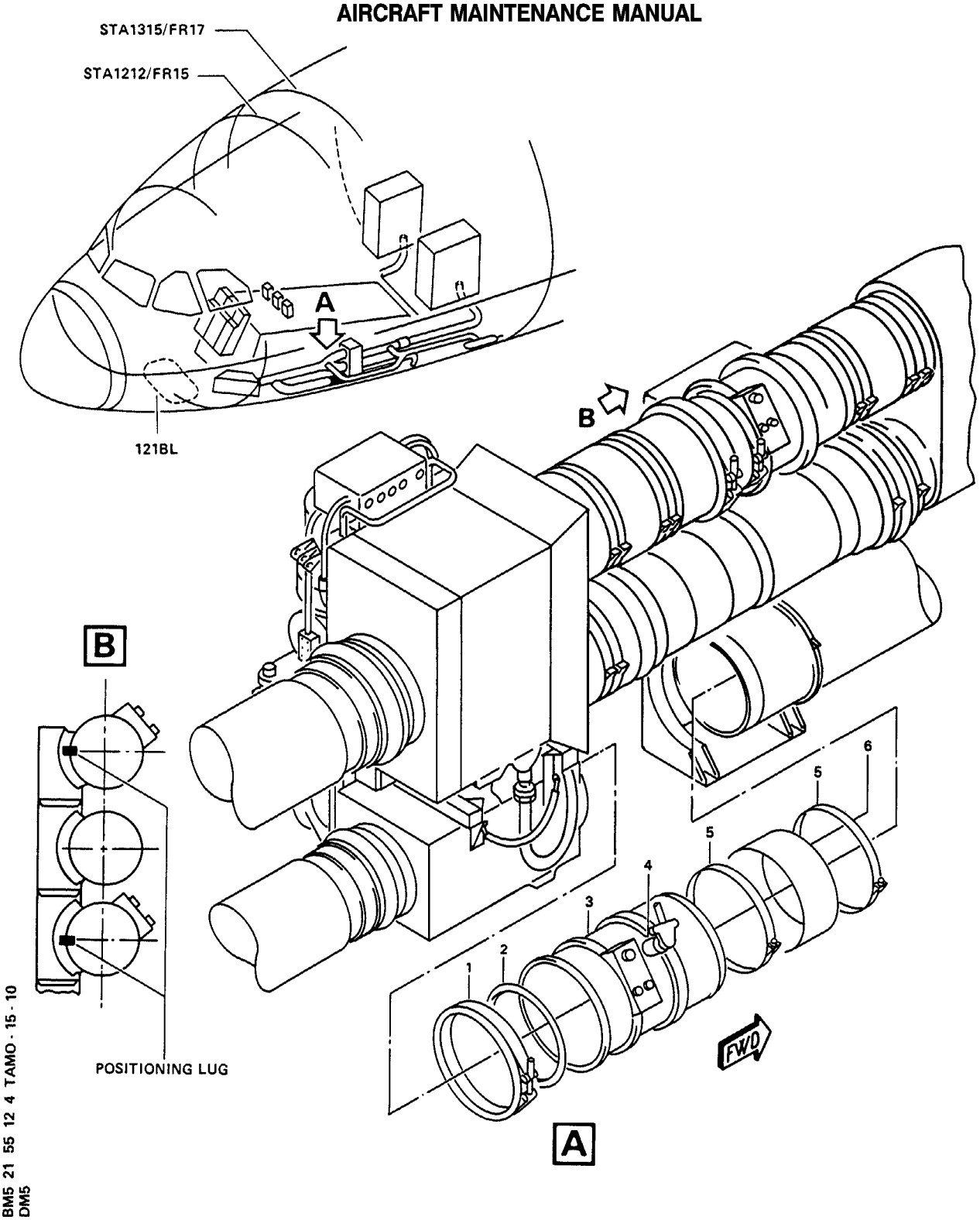
A. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILATION/GND COOL/FAN	1HD	312/G64

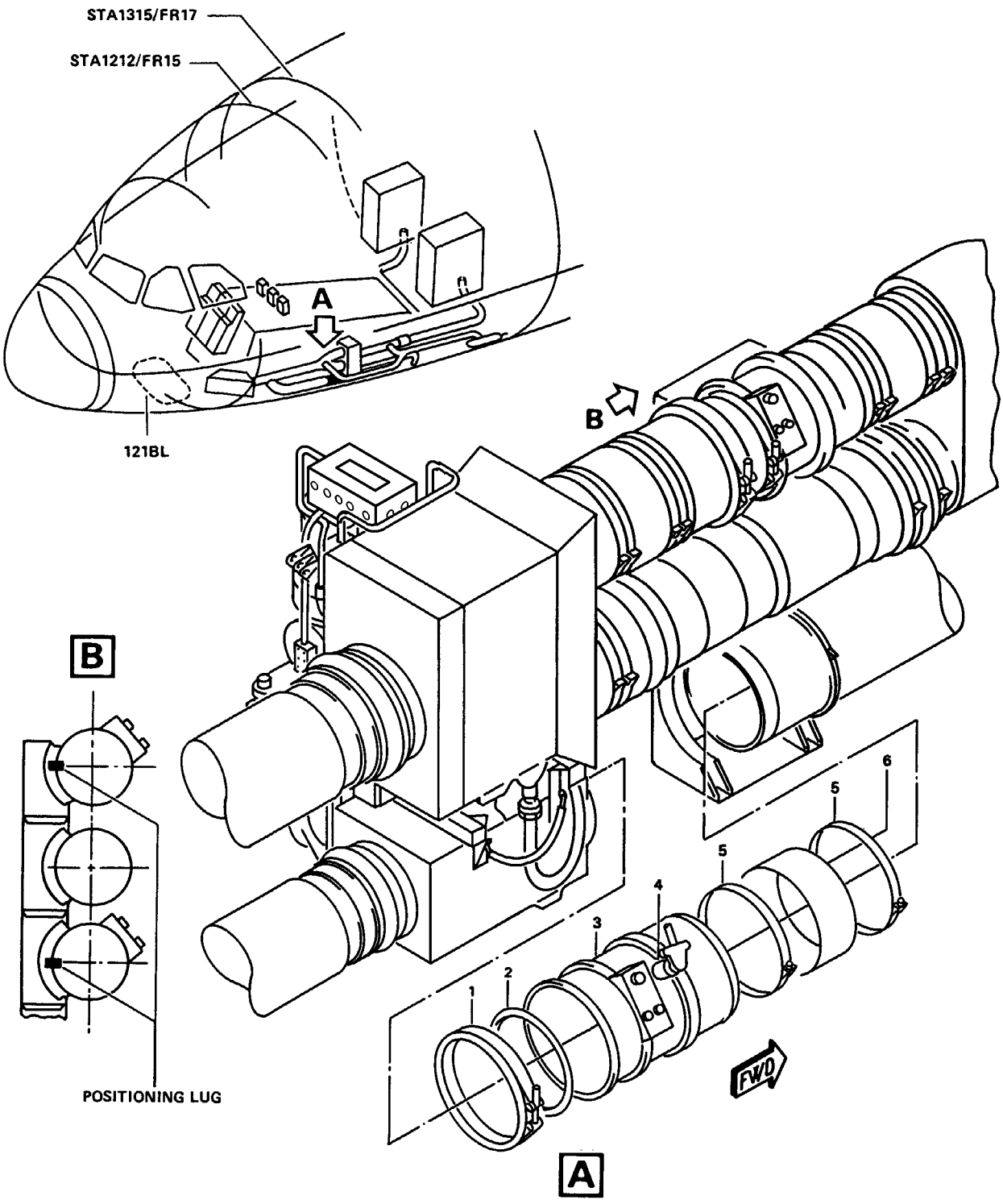
(2)Open access door 121BL.

B. Removal
(1)Disconnect electrical connector (4).
(2)Remove the two clamps (5) from flexible sleeve (6). Slide flexible sleeve onto duct to free fan (3).
(3)Remove clamp (1) and remove fan (3).
(4)Remove and discard O-ring (2).
(5)Cap open duct ends and electrical connector (4).

C. Installation
(1)Clean and inspect fan interface and/or adjacent area.
(2)Remove blanking plugs/caps and check condition of fan flange and electrical connector (4).
(3)Install new O-ring (2) in groove on fan (3) flange.
(4)Install fan (3) on ground cooling unit and in flexible sleeve (6).
(5)Make certain that O-ring (2) is correctly installed in groove and install



Ground Cooling Unit Fan
Figure 401



Ground Cooling Unit Fan
Figure 402

R

clamp (1) ; do not tighten at this stage.

**ON A/C 001-005,

(6)Rotate fan (3) so that angular positioning lug of mount can be engaged in fan notch (Ref. Fig. 401).

**ON A/C 006-100,

(6)Rotate fan (3) so that angular positioning lug of mount can be engaged in fan notch (Ref. Fig. 402).

**ON A/C 001-100,

(7)Tighten clamp (1) ; TORQUE nut to value given on clamp.
(8)Install flexible sleeve (6) ; install and tighten the two clamps (5).
(9)Connect electrical connector (4) to fan (3).
(10)Remove safety clip and tag and close circuit breaker 1HD.

D. Test
Perform operational test of ground cooling (Ref. 21-55-00, P. Block 501).

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 121BL.

GROUND COOLING VALVE 22HD - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking Plug/Cap
C.	Access Platforms 2.60 m (8 ft. 6 in.)
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

2. Procedure (Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILATION/GND COOL/WARN	4HD	311/H61
131VU	VENTILATION/GND COOL/CTL	5HD	311/H62

B. Removal

(1)Position access platform.
(2)Remove the fourteen screws (3).
(3)Free valve (2) by pulling downwards and disconnect electrical connector (1).
(4)Disconnect bonding strip (4) from attachment tab on aircraft structure.
(5)Remove valve (2).
(6)Cap electrical connector (1).

C. Installation

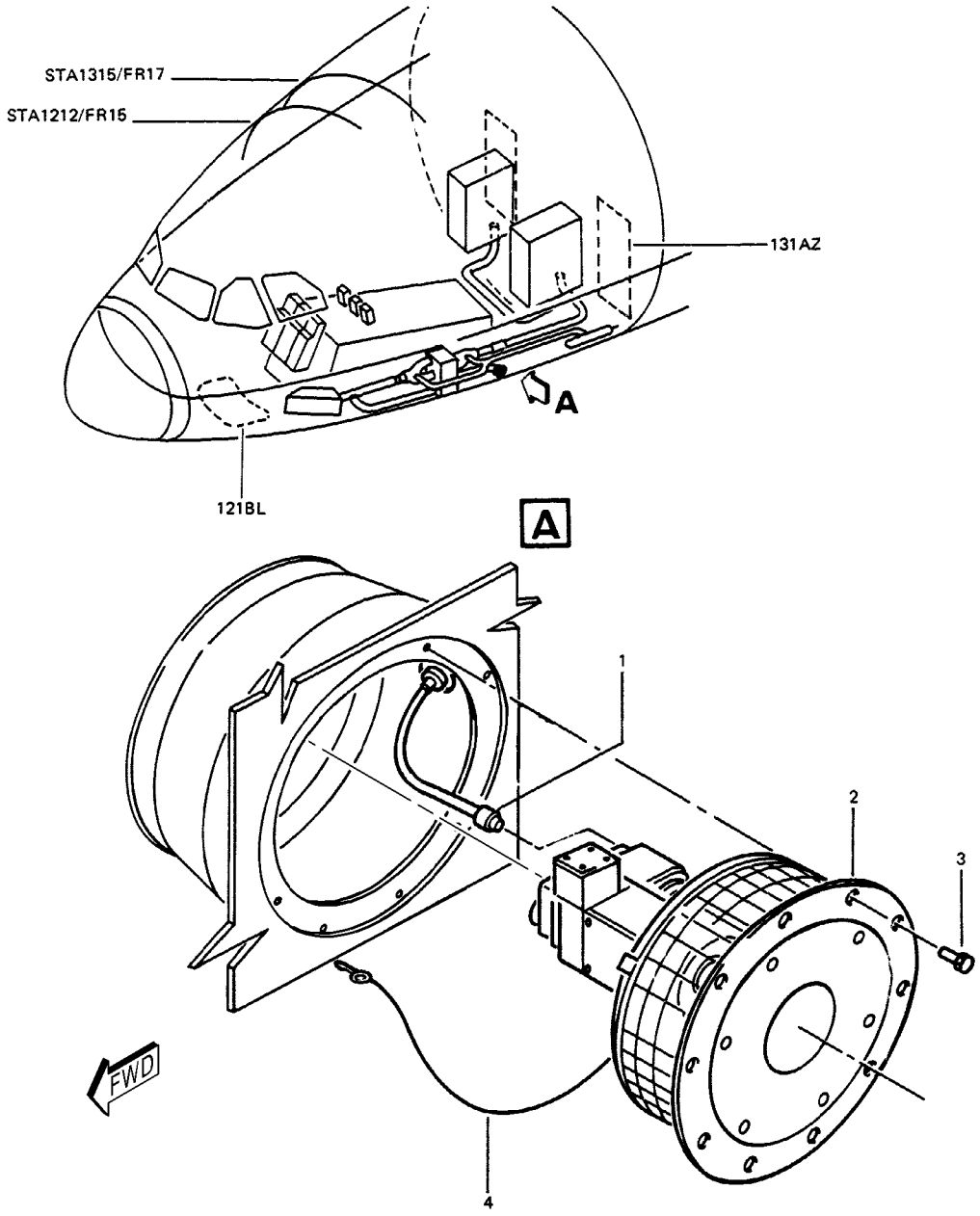
(1)Clean and inspect valve interface and/or adjacent area.
(2)Remove blanking plug/cap and check condition of electrical connector (1).
(3)Connect bonding strip (4) to attachment tab on aircraft structure and connect electrical connector (1).
(4)Install valve (2) in housing. Install and tighten the fourteen screws (3).
(5)Remove safety clips and tags and close circuit breakers 5HD and 4HD.

D. Test

(1)Job set-up

CAUTION : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ON VENT PANEL 438VU GND COOL/AUTO/CTL PUSHBUTTON SWITCH IS RELEASED (OUT).

(a)Make certain that circuit breakers are closed, particularly those associated with VENTILATION.
(b)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Make certain that electronics racks ventilation is correct.



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R

Ground Cooling Valve
Figure 401

(d)On panel 9VU
- Make certain that ENG1 and ENG2 HP fuel levers are in OFF position.

(e)On VENT panel 438VU
- GND COOL/OVRD pushbutton switch is pressed (ON legend on)
- OFF legend of GND COOL/AUTO/CTL pushbutton switch is on.

(f)On maintenance panel 472 VU
- place ANN LT switch in READ position.

(2)Test

ACTION	RESULT
	Ground cooling valve is closed
1. On VENT panel 438VU - press GND COOL/AUTO/CTL pushbutton switch	On VENT panel 438VU - OFF legend of GND COOL/AUTO/CTL pushbutton switch goes off After 10 seconds approx. the ground cooling valve is open
- release GND COOL/AUTO/CTL pushbutton switch	- OFF legend of GND COOL/AUTO/CTL pushbutton switch comes on - the ground cooling valve closes

E. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Restore system and aircraft to normal operating conditions.

(3)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(4)Remove access platform.

Ref.: MEL Sect. 1-21, item 27
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.

1. Deactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips

B. Procedure
(1)Job set-up
(a)On VENT panel 438VU
- make certain that GND COOL/AUTO/CTL pushbutton is released (OFF legend on).
(b)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILATION/GND COOL/CTL	5HD	311/H62
131VU	VENTILATION/GND COOL/WARN	4HD	311/H61

R (c)Close valve using control handle.
R (d)On ECAM control panel, press CLR pushbutton switch to clear GND COOL VALVE OPEN message displayed on L ECAM display unit.
(2)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Make an entry in the aircraft technical log.

2. Reactivation

A. Procedure
(1)Job set-up
(a)Make certain that the following circuit breakers are open, safetied and tagged :

PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILATION/GND COOL/CTL	5HD	311/H62
131VU	VENTILATION/GND COOL/WARN	4HD	311/H61

R (b)Turn manual control handle counterclockwise to open the valve.
R (c)Remove safety clips and tags and close circuit breakers 4HD and 5HD.
R (d)On VENT panel 438VU :
- press GND COOL/AUTO/CTL pushbutton switch (OFF legend goes off).
R (e)Troubleshoot the system (Ref. TSM 21-55-00).

(2)Close-up
(a)Make certain that working area is clear of tools and miscellaneous items of equipment.
(b)Clear technical log.

GROUND COOLING AIRFLOW DETECTOR 18HD - REMOVAL/INSTALLATION

R

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking Plugs/Caps
C.	O-Ring
D.	Torque Wrench 0.6 m.daN (53 lbf. in.)
Referenced Procedure - 21-55-00, P. Block 501	Ground Cooling

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
131VU	VENTILATION/GND COOL/CTL	5HD	311/H62

(2)Open access door 121BL.

B. Removal

(1)Disconnect electrical connector (4).
(2)Remove clamp (2) and airflow detector (3).
(3)Remove and discard O-ring (1).
(4)Cap open duct ends and electrical connector (4).

C. Installation

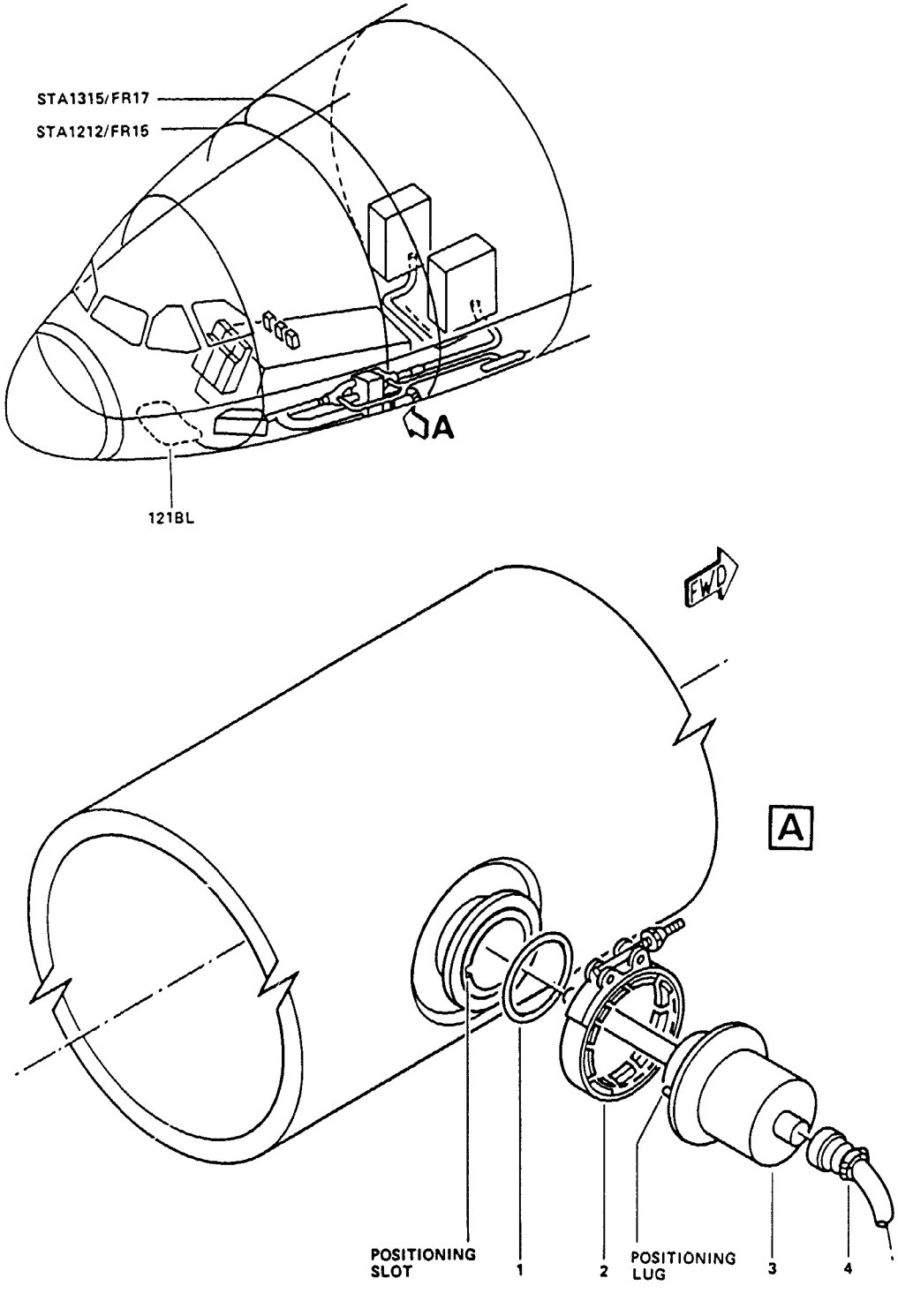
(1)Remove blanking plugs/caps and check condition of duct flange and electrical connector (4).
(2)Clean and inspect airflow detector interface and/or adjacent area.
(3)Install new O-ring (1) in groove on duct flange.
(4)Install airflow detector (3) paying attention to positioning lug. Install clamp (2) ; TORQUE nut to value given on clamp.
(5)Connect electrical connector (4) to airflow detector (3).

D. Test

Perform operational test of ground cooling (Ref. 21-55-00, P. Block 501).

E. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 121BL.
(3)Remove safety clip and tag and close circuit breaker 5HD.



Ground Cooling Airflow Detector
Figure 401

TEMPERATURE CONTROL - DESCRIPTION AND OPERATION

1. General

The temperature control system serves to control automatically or manually the desirable temperature levels inside the occupied compartments of the aircraft.
Automatic temperature control is the normal mode of control ; the manual temperature control mode is the standby mode.
The desired temperature is obtained by mixing air from two sources :
- a source of hot air bled upstream of the refrigeration unit packs and supplied by the engines, the APU or an HP ground air supply unit
- a source of cold air supplied by the refrigeration unit packs.

2. Description

(Ref. Fig. 001)
The temperature control system includes :
- the pack temperature control system
- the trim air control and overheat monitoring system
- the flight compartment and cabin temperature control system
- the cargo compartment temperature control.

A. Pack Temperature Control (Ref. 21-61-00)

The pack temperature control system serves to regulate the pack discharge temperature and to limit the minimum and maximum temperatures.
The two refrigeration unit packs are identical and independent.

B. Trim Air Control and Overheat Monitoring (Ref. 21-62-00)

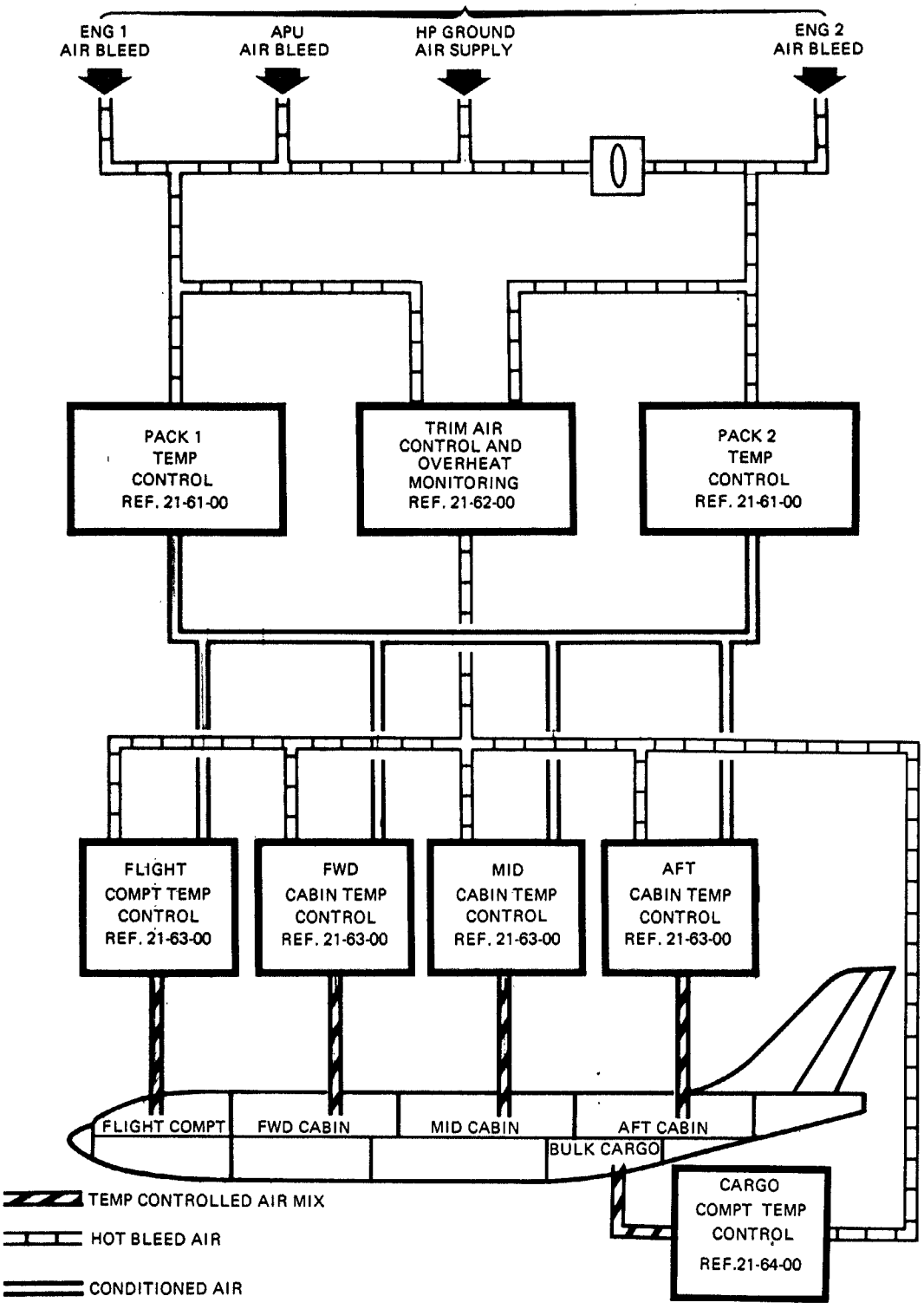
The system controls and monitors the pressure and temperature of hot air (trim air) used for conditioning the occupied compartments.

C. Flight Compartment and Cabin Temperature Control (Ref. 21-63-00).

The system ensures automatic or manual temperature control in the flight compartment and the three cabin zones (FWD, MID and AFT). Each of the four zones has an independent temperature control system (automatic or manual) which modulates the hot air to be mixed with cold air.

D. Cargo Compartment Temperature Control (Ref. 21-64-00)

The BULK cargo compartment air conditioning system is automatically or manually controlled by the temperature control system to maintain the compartment temperature at a predetermined value.


ENG 1 AIR BLEED
APU AIR BLEED
HP GROUND AIR SUPPLY
ENG 2 AIR BLEED
PACK 1 TEMP CONTROL REF. 21-61-00
TRIM AIR CONTROL AND OVERHEAT MONITORING REF. 21-62-00
PACK 2 TEMP CONTROL REF. 21-61-00
FLIGHT COMPT TEMP CONTROL REF. 21-63-00
FWD CABIN TEMP CONTROL REF. 21-63-00
MID CABIN TEMP CONTROL REF. 21-63-00
AFT CABIN TEMP CONTROL REF. 21-63-00
FLIGHT COMPT
FWD CABIN
MID CABIN
AFT CABIN
BULK CARGO
CARGO COMPT TEMP CONTROL REF.21-64-00
TEMP CONTROLLED AIR MIX
HOT BLEED AIR
CONDITIONED AIR

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Temperature Control - Block Diagram
Figure 001

PACK TEMPERATURE CONTROL - DESCRIPTION AND OPERATION

1. General

The purpose of the system is to ensure :

- temperature control at the refrigeration unit pack outlet to meet the temperature demands from the flight compartment and the three cabin zones (**FWD CABIN, MID CABIN** and **AFT CABIN**).
- limitation of maximum temperature to 63°C (145°F) and minimum temperature to 4°C (40°F) in normal cooling mode or to -7°C (20°F) in maximum cooling mode (**MAX COOL**).

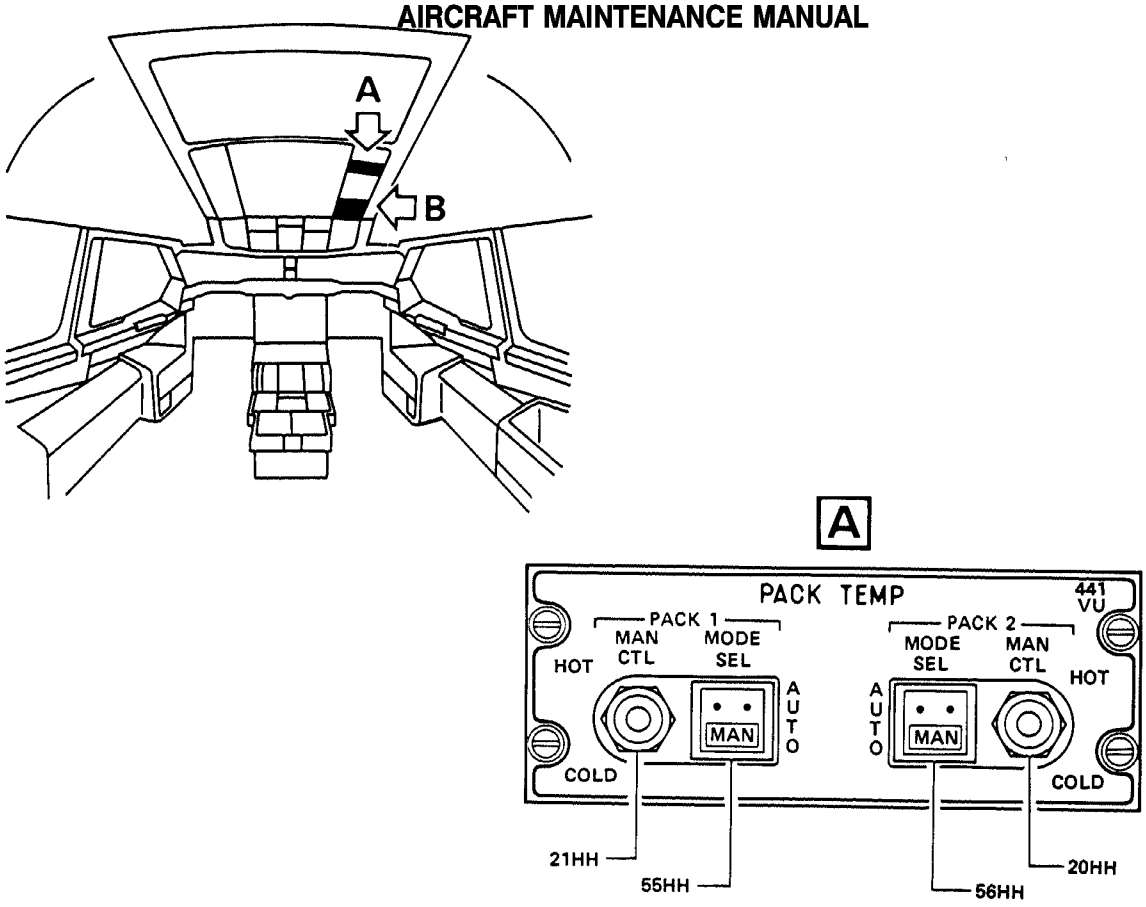
The two refrigeration unit packs are identical and independent.

2. Component Location

3. Description

A. Pack Temperature Control
(Ref. Fig. 001)
(Ref. Fig. 002)
(Ref. Fig. 003)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
10HH	CONTROLLER-TEMP, PACK 2	91VU	122	121BL	21-61-15
11HH	CONTROLLER-TEMP, PACK 1	91VU	122	121BL	21-61-15
14HH	SENSOR-DISCH TEMP CTL, PACK2		135	136AR	21-61-17
15HH	SENSOR-DISCH TEMP CTL, PACK1		135	136AR	21-61-17
16HH	ACTUATOR-RAM/TURBINE BYPASS VALVE, PACK2		144	144FR	21-61-13
17HH	ACTUATOR-RAM/TURBINE BYPASS VALVE, PACK1		143	143FL	21-61-13
20HH	SELECTOR SWITCH-PACK TEMP/PACK2/MAN CTL	441VU	212		21-61-00
21HH	SELECTOR SWITCH-PACK TEMP/PACK1/MAN CTL	441VU	212		21-61-00
55HH	P/BSW-PACK TEMP/PACK1 MOD SEL	441VU	212		21-61-00
56HH	P/BSW-PACK TEMP/PACK2 MOD SEL	441VU	212		21-61-00
70HH	P/BSW-COMPT TEMP/MAX COOL	437VU	212		21-61-00
37HK	CONTROLLER-APU AND PACK TEMP DEMAND	91VU	122	121BL	21-61-16
18WV	VALVE-TURBINE BYPASS, PACK2		144	147BZ	21-61-11
19WV	VALVE-TURBINE BYPASS, PACK1		143	147BZ	21-61-11
20WV	SENSOR-TURBINE INLET TEMP, PACK2		144	147BZ	21-61-19
21WV	SENSOR-TURBINE INLET TEMP, PACK1		143	147BZ	21-61-19
22WV	SENSOR-DISCHARGE TEMP, PACK2		135	136AR	21-61-18
23WV	SENSOR-DISCHARGE TEMP, PACK1		135	136AR	21-61-18
	FLEXIBLE CONTROL-TURBINE BYPASS VALVE, PACK1		143	147BZ	21-61-14
	FLEXIBLE CONTROL-TURBINE BYPASS VALVE, PACK2		144	147BZ	21-61-14



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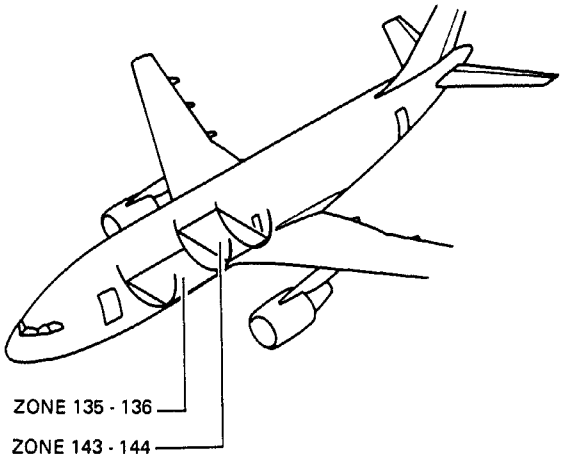
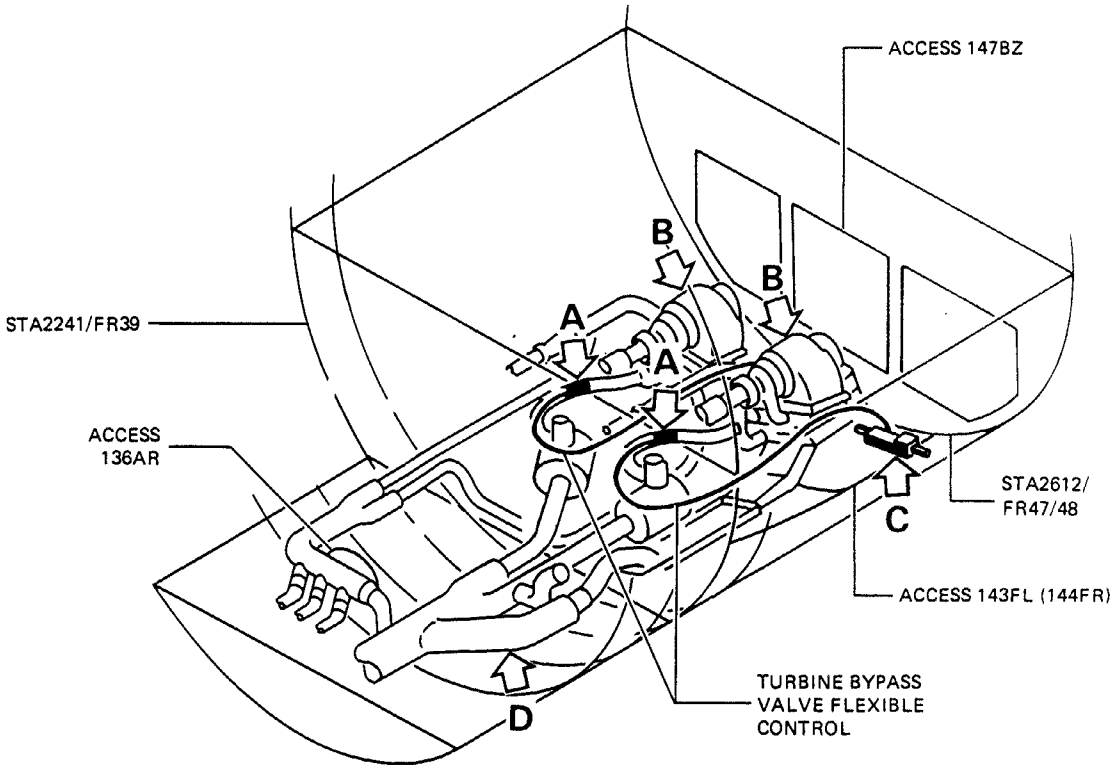
Pack Temperature Control - Controls and Indicating
Figure 001





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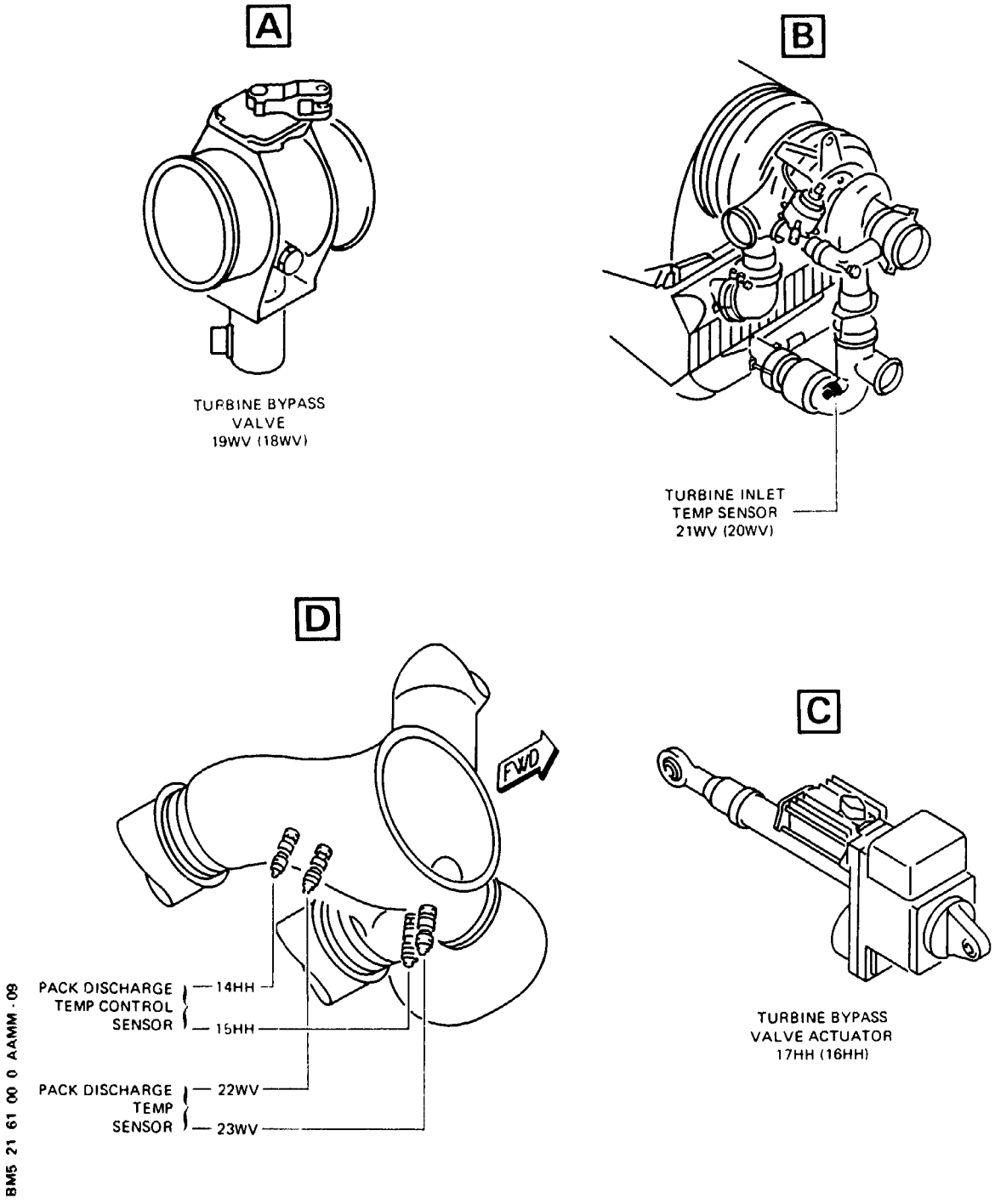
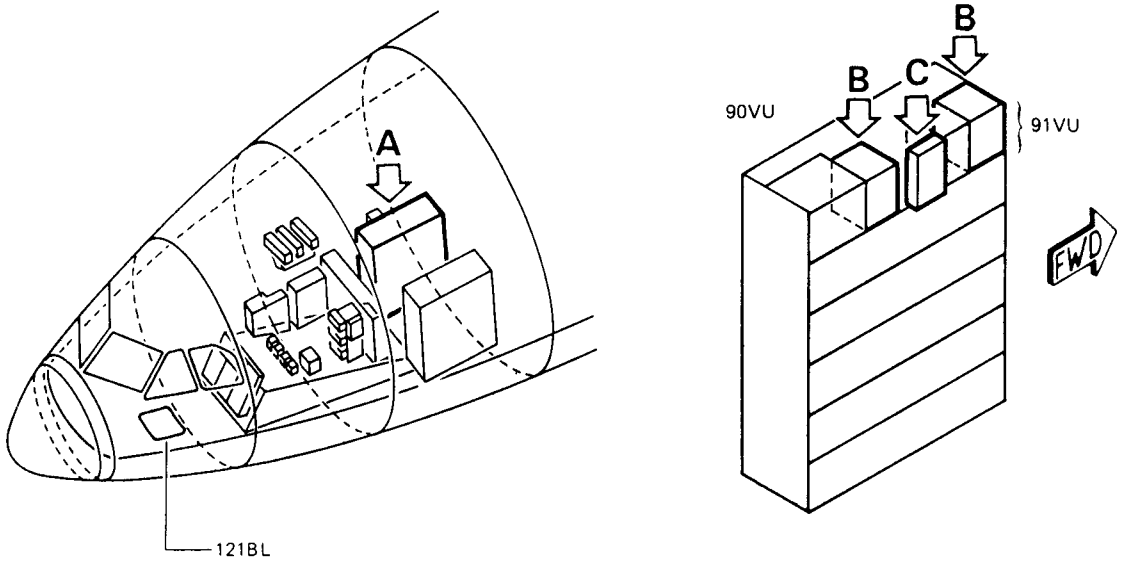
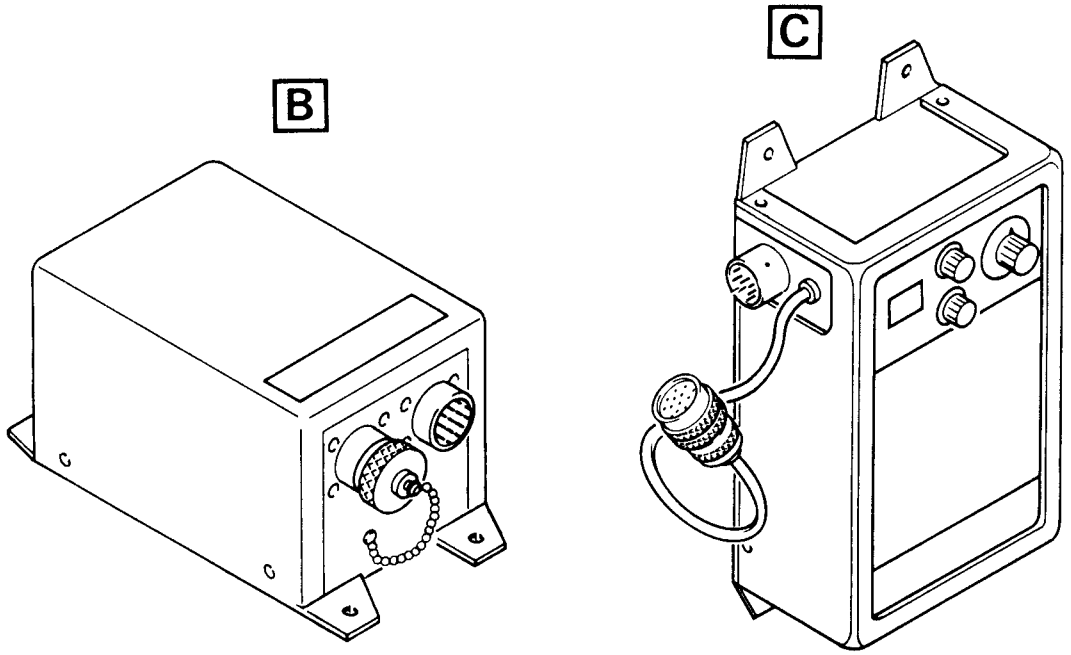
Pack Temperature Control - Component Location - Sheet 1/2
Figure 002



Pack Temperature Control - Component Location - Sheet 2/2
Figure 002





PACK1 (PACK2)
TEMPERATURE CONTROLLER
11HH (10HH)

APU AND PACK TEMPERATURE
DEMANDE CONTROLLER 37HK

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Pack Temperature Control - Controllers Location
Figure 003

R

R (Ref. Fig. 004)
Temperature control of each refrigeration unit pack is ensured by :
- ram/turbine bypass valve actuator 17HH (16HH) which drives the cooling air outlet modulation flap designed to regulate ram air flowing through the pack heat exchanger ; the actuator also controls pack 1 (pack 2) turbine bypass valve 19WV (18WV) via a flexible control.
- pack 1 (pack 2) temperature controller 11HH (10HH) which drives actuator 17HH (16HH) according to the signals transmitted from pack 2 (pack 1) discharge temperature control sensor 14HH (15HH) and APU and pack temperature demand controller 37HK.

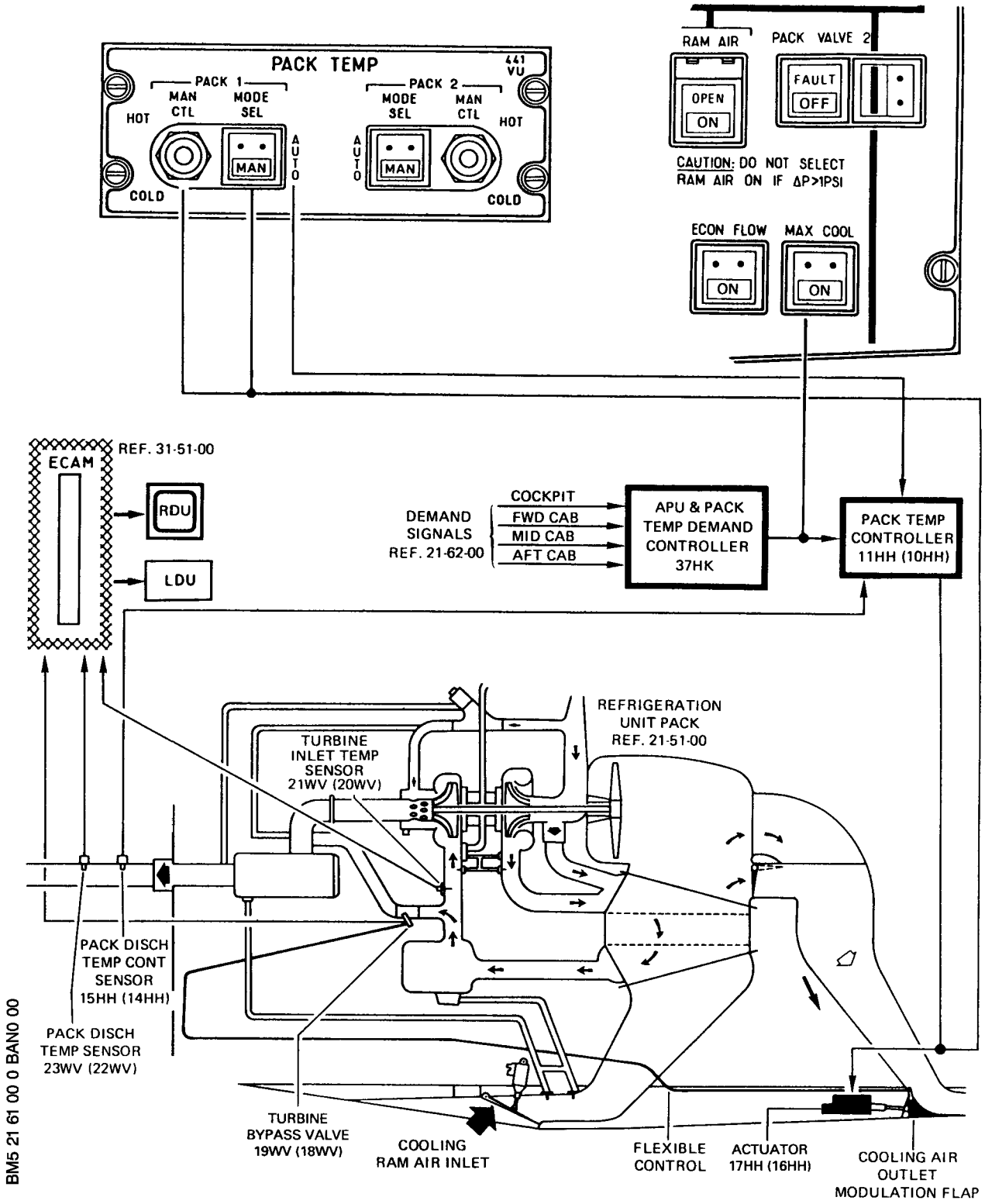
B. Controls and Indicating
(Ref. Fig. 005)

C. Central Warnings
Indications and parameters relative to normal or abnormal system operation are displayed on the ECAM display units (Ref. 31-51-00).
(1)Right ECAM display unit
The following indications and parameters are displayed on the AIR BLEED page synoptic diagram :
- turbine inlet temperature
- pack discharge temperature
- turbine bypass valve position
- cold air duct supply (flow arrow).
(2)Left ECAM display unit
R (a)Not applicable.
(b)A message is displayed in the event of faulty operation causing pack shut-down (illumination of FAULT legend on PACK VALVE pushbutton switch on overhead panel, Ref. 21-11-00).

4. Component Description

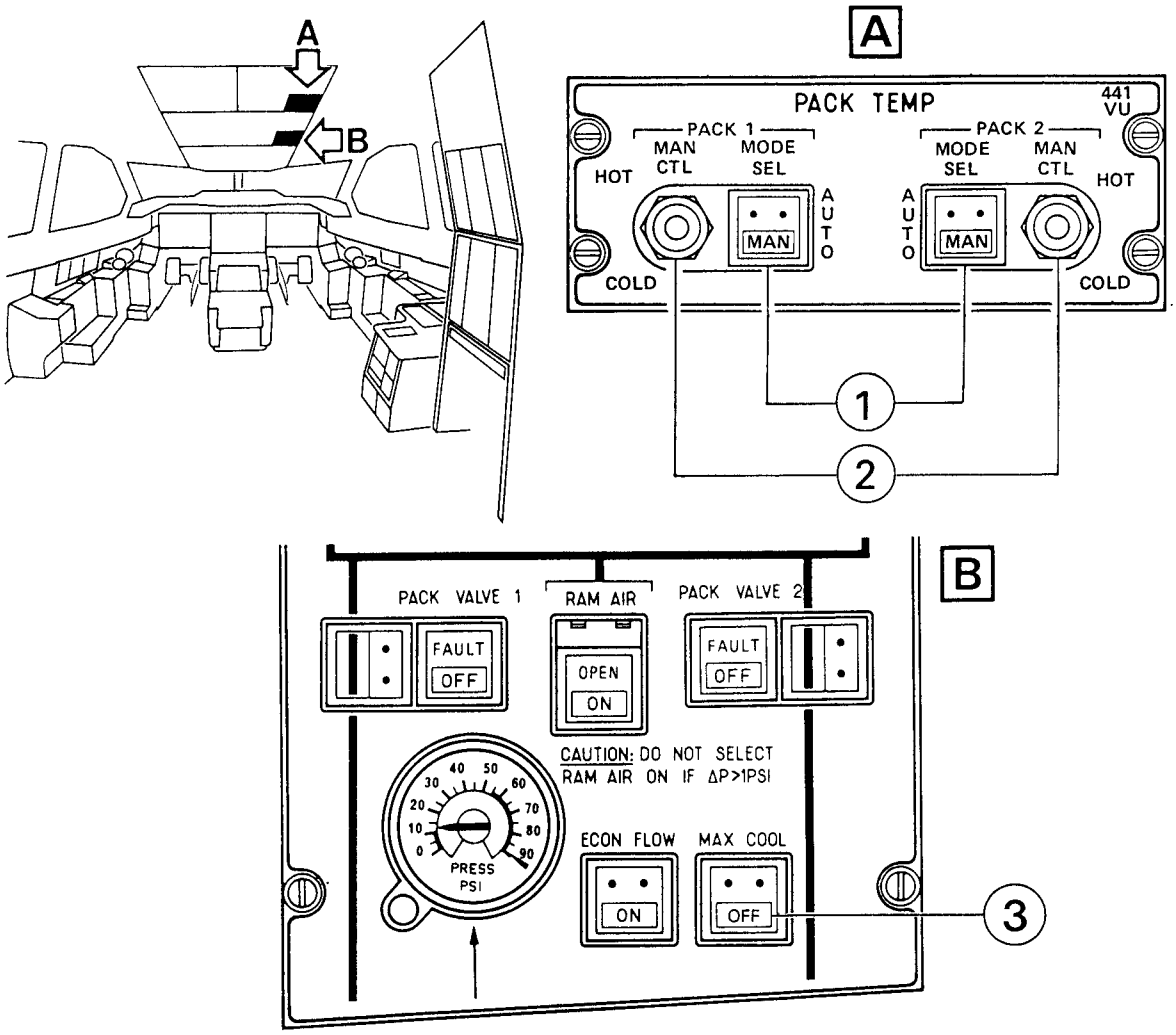
A. Ram/Turbine Bypass Valve Actuator 17HH (16HH)
(Ref. Fig. 006)
The ram/turbine bypass valve actuator is a linear and electromagnetic actuator which mechanically actuates turbine bypass valve 19WV (18WV) ; the valve operation is associated with that of the cooling air outlet modulation flap.
The actuator consists mainly of a 115VAC single phase electric motor protected by a thermal switch, a drive shaft integral with the motor, a gear reduction system, a jackscrew driven by the shaft and limit switches. The pack temperature controller or the pack manual temperature control selector switch (HOT or COLD positions) transmits the control signal to the actuator. The electric motor rotates the drive shaft through the gear reduction system, the jackscrew integral with the drive shaft changes the circular movement of the shaft into a linear movement which causes the actuator to extend or retract. The limit switches limit the maximum retraction and extension of the actuator.

B. Turbine Bypass Valve 19WV (18WV)
(Ref. Fig. 007)



Pack Temperature Control - System Diagram
Figure 004

R



-1 PACK 1 (PACK 2) MODE SEL PUSHBUTTON SWITCH 55HH (56HH) SERVES TO SELECT PACK TEMPERATURE CONTROL MODE.
- PUSHBUTTON SWITCH PRESSED (IN) (AUTO) : PACK TEMPERATURE IS CONTROLLED IN AUTOMATIC MODE
- PUSHBUTTON SWITCH RELEASED (OUT) (WHITE MAN LEGEND ON) : TEMPERATURE CONTROL IS ACHIEVED IN MANUAL MODE.

-2 PACK 1 (PACK 2) MANUAL TEMPERATURE CONTROL SELECTOR SWITCH 21HH (20HH) WITH SPRING-LOADED CENTER POSITION (ACTIVE ONLY IF THE TEMPERATURE CONTROL MANUAL MODE IS SELECTED) :
- COLD POSITION : THE SELECTOR SWITCH CONTROLS THE OPENING OF THE COOLING AIR OUTLET MODULATION FLAP AND CLOSURE OF THE TURBINE BYPASS VALVE (PACK DISCHARGE TEMPERATURE DECREASES).
- HOT POSITION : THE SWITCH CONTROLS CLOSURE OF THE COOLING AIR OUTLET MODULATION FLAP AND OPENING OF THE TURBINE BYPASS VALVE (PACK DISCHARGE TEMPERATURE INCREASES).

-3 MAX COOL PUSHBUTTON SWITCH 70HH ENABLES PACK DISCHARGE MAXIMUM COOLING MODE TEMPERATURE LIMITATION.
- PUSHBUTTON SWITCH PRESSED (IN) (ON BLUE LEGEND ON) : MINIMUM TEMPERATURE LIMITATION IS REDUCED FROM 4°C TO -7^{O} C.

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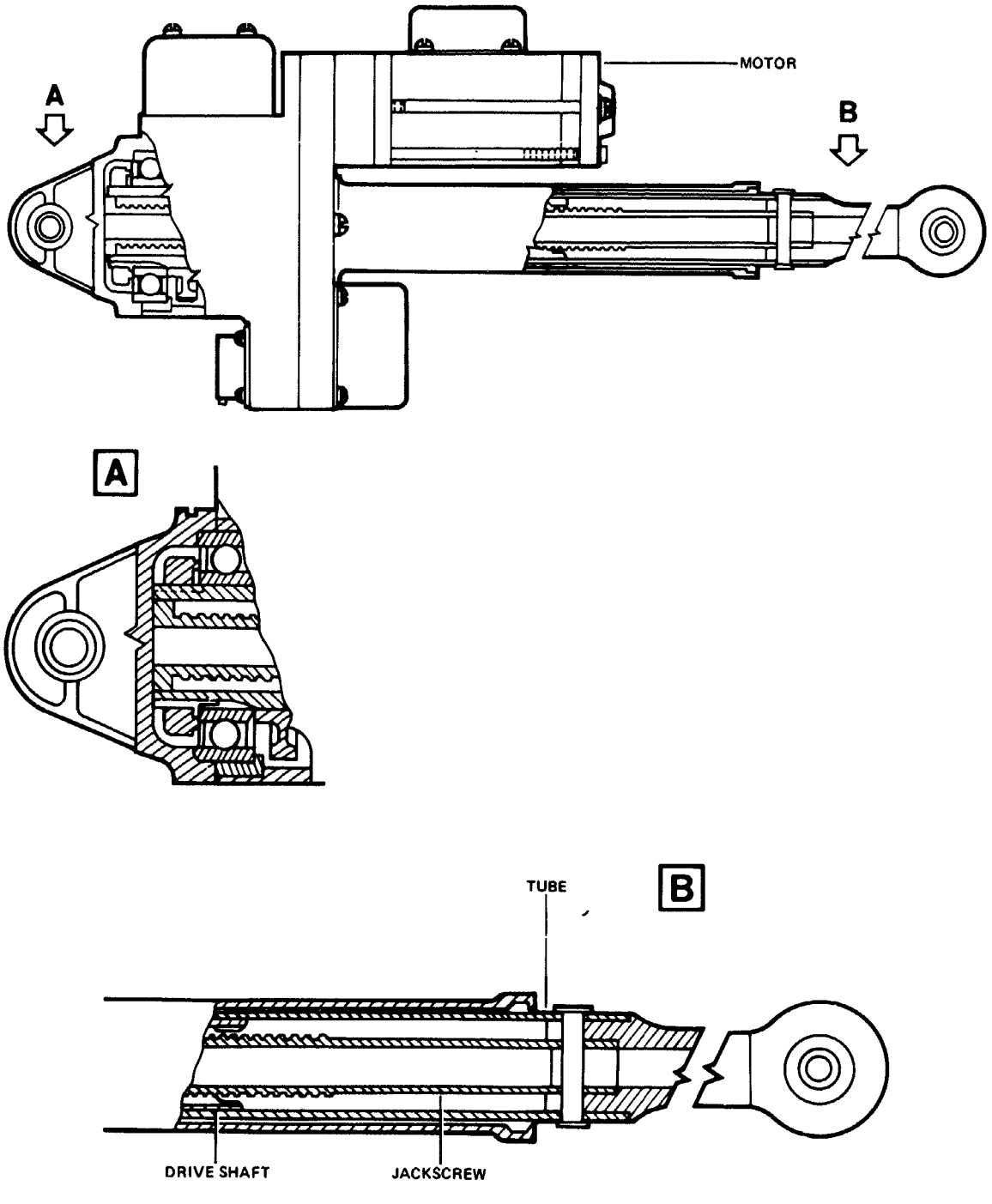
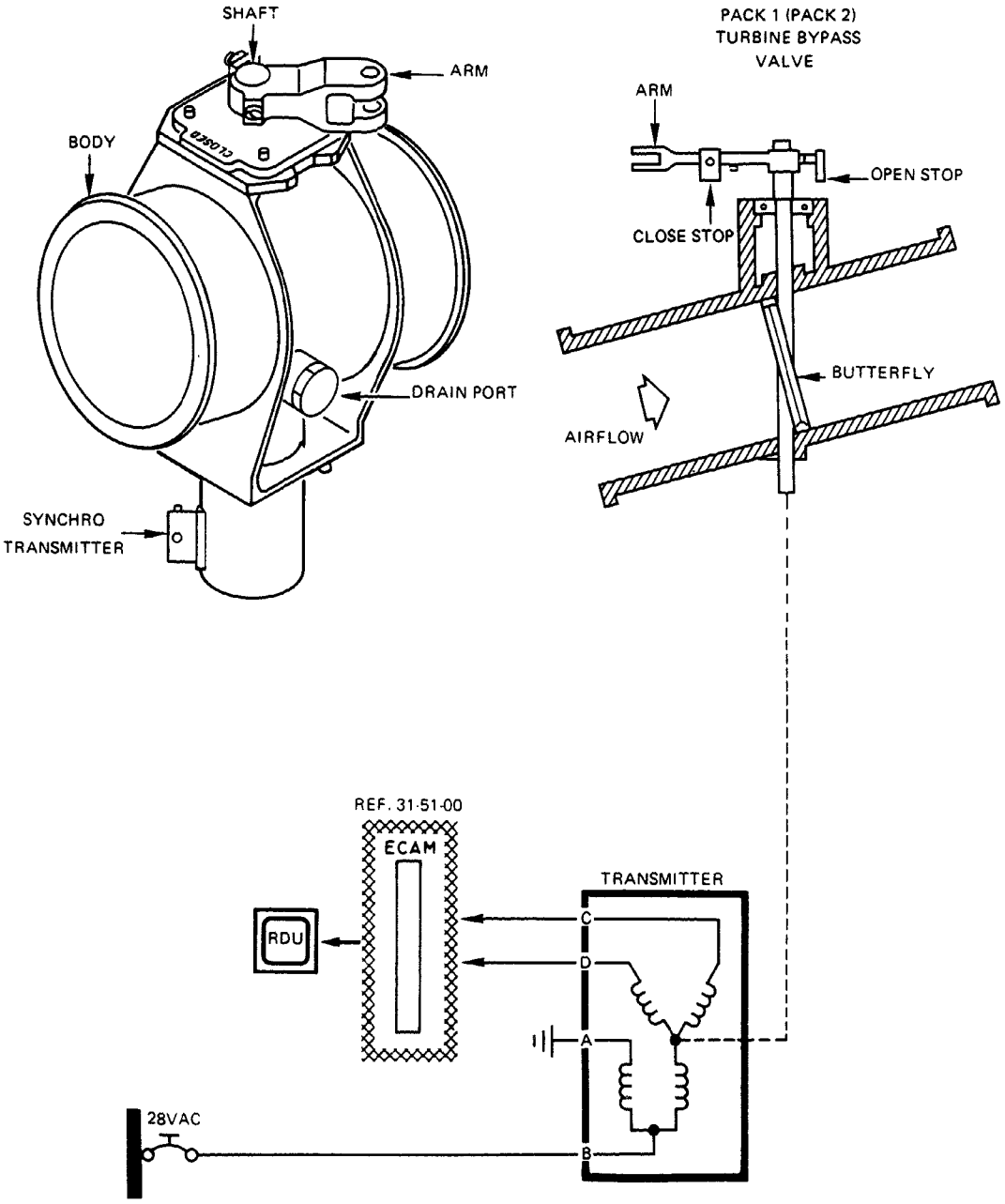
PACK TEMP Panel - Controls and Indicating
Figure 005

R



Ram/Turbine Bypass Valve Actuator 17HH (16HH)
Figure 006



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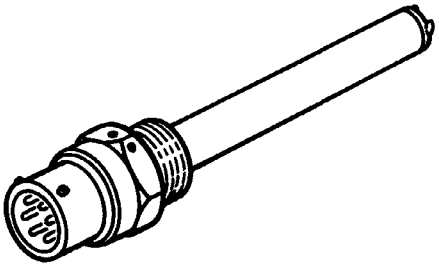
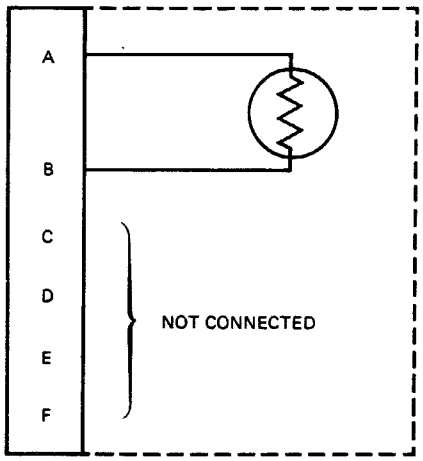
Turbine Bypass Valve
Figure 007

The turbine bypass valve is a butterfly modulating shutoff valve located in the pack turbine bypass duct. One valve is provided for each of the two packs. The valve consists of an arm, butterfly valve, adapter, synchro transmitter and body. The arm is attached to the butterfly shaft and connects to the mechanical linkage from the ram/turbine bypass valve actuator. The synchro transmitter is connected to the butterfly shaft opposite the arm and transmits valve position signal to the right ECAM display unit. Airflow is modulated or shutoff by the mechanical actuation of the arm assembly which in turn rotates a shaft and plate (butterfly). The travel of the arm assembly towards the open position is mechanically restricted by a fixed open stop. The travel towards the closed position is mechanically restricted by an adjustable close stop. The turbine bypass valve is positioned by the ram/turbine bypass valve actuator.

C. Pack Discharge Temperature Control Sensor 15HH (14HH)
(Ref. Fig. 008)
The sensor senses the temperature of air flowing through the pack outlet duct and transmits the information to associated pack temperature controller 11HH (10HH). The sensing element is located in a cylindrical plunger and consists of a thermistor the resistance of which varies with the temperature.





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Pack Discharge Temperature Control Sensor 15HH (14HH) - Schematic
Figure 008

D. APU and Pack Temperature Demand Controller 37HK
(Ref. Fig. 009)

(1)Functions

The APU and pack temperature demand controller performs the following functions :

(a)Zone/pack interface

The APU and pack temperature demand controller receives temperature demand signals from the three cabin zones and the flight compartment ; the controller identifies the zone demanding the lowest temperature and delivers the information to the pack temperature controller.

(b)Zone/APU interface

The APU and pack temperature demand controller delivers a bleed load demand signal to the APU in response to a more heating or more cooling demand from the pack temperature controllers.

(c)BITE

The APU and pack temperature demand controller incorporates a BITE test which checks in addition to the controller itself, the whole of the automatic temperature control system for correct operation : the zone temperature controllers, the pack temperature controllers and the various temperature sensors.

(2)Description

The controller is a chassis-mounted electronic assembly mainly comprising a comparator module, two discriminator modules, stages 1 and 2, an APU rate control module and a BITE supply module.

The face of the controller features a twelve-position rotary switch, a GO green light, a NO GO red light, a BITE READY yellow light and detailed instructions for performing the tests.

The APU and pack temperature demand controller is provided with a test connector to test the other temperature controllers associated with the automatic temperature control system ; when not used, the connector is stowed on the rack.

(3)Operation

(a)Pack/zone interface

The cooling demands are provided by two discriminator modules.

The demand signals from the flight compartment are supplied through diodes to an amplifier forming pack 1 system channel.

The demand signals from the cabin zones are applied to an amplifier forming pack 2 system channel.

These demand signals are applied to the diodes, the most negative signal makes the relevant diode conductive.

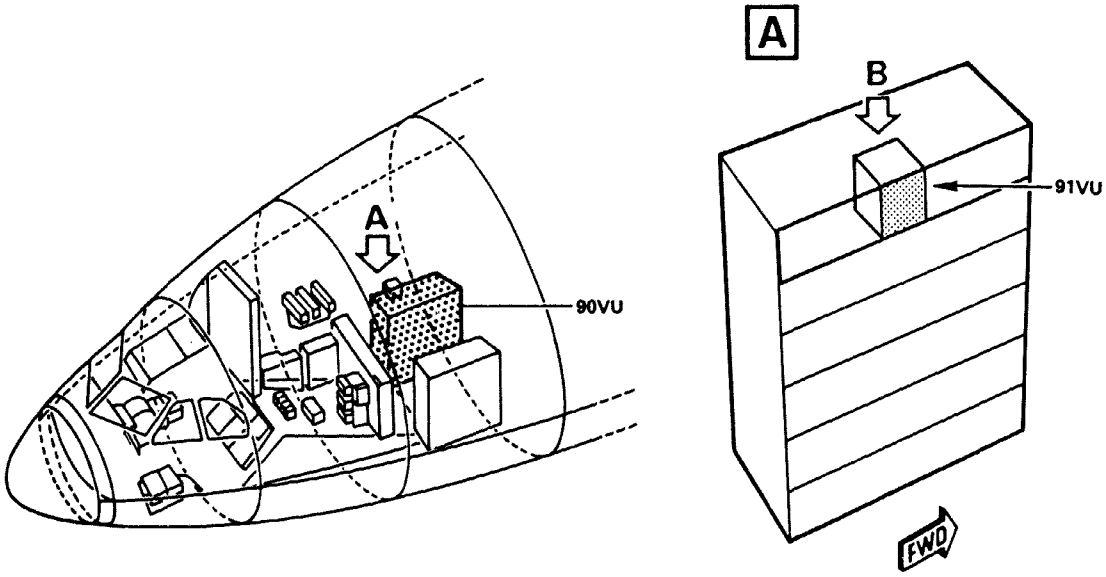
Two cases are possible :

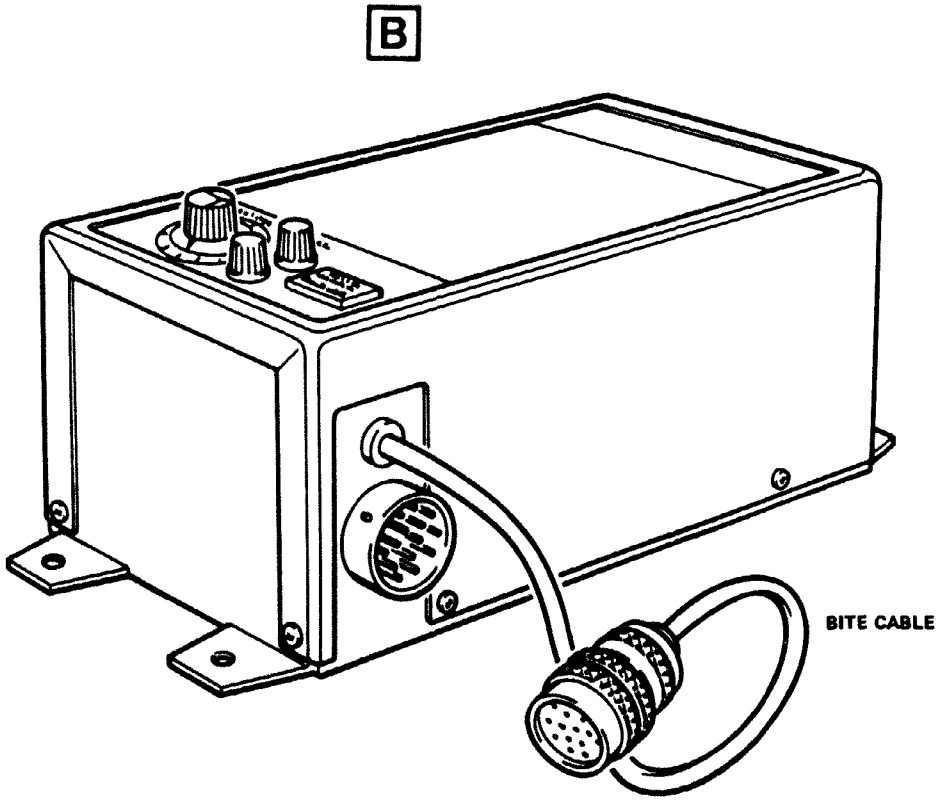
1 The flight compartment demands the lowest temperature of all zones :
- Pack 1 temperature controller is controlled through pack 1 channel
- Pack 2 temperature controller is controlled through pack 2 channel.

2 One of the three cabin zones demands the lowest temperature :
Pack 1 and pack 2 temperature controllers are controlled through pack 2 channel. In this case independent temperature control of both packs is inhibited. Both packs are controlled by the demand signal from that zone.

(b)Zone/APU interface

This system consists of two channels :





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APU and Pack Temperature Demand Controller 37HK
Figure 009

- a cooling demand channel.
- a heating demand channel.

Outputs from the channels are applied to a discriminator and the required bleed load demand signal is applied to the APU electronic control box.

(c)BITE

(Ref. Fig. 010)

The APU and pack temperature demand controller enables the tests described in the table below to be performed.

	PACK SUBSYSTEM		ZONE SUBSYSTEM	
BITE SW POS	INDICATES FAULT IN	TEST METHOD	INDICATES FAULT IN	TEST METHOD
1.	Temp demand controller	Inject signal into discriminator and check sum of outputs of pack scaling amplifiers	Temp demand controller	Inject signal into discriminator and check sum of outputs of pack scaling amplifiers
2.	Temp demand controller	Inject signal into discriminator and check APU speed demand signal for maximum cooling	Temp demand controller	Inject signal into discriminator and check APU bleed load demand signal for maximum cooling
3.	Temp demand controller	Inject signal into discriminator and check APU speed demand signal for maximum heating	Temp demand controller	Inject signal into discriminator and check APU bleed load demand signal for maximum heating
4.	Pack temp controller	Check bridge power supply output	Zone temp controller	Check bridge power supply output
5.	No test		Zone temp controller	Inject signal into duct amplifier and check amplifer output
6.	No test	Drive actuator in more heat direction	No test	Drive actuator in more heat direction
7.	Pack temp controller	Override bridge output with signal to produce full on cooling output	Zone temp controller	Override bridge output with signal to produce full on cooling output

	PACK SUBSYSTEM		ZONE SUBSYSTEM	
BITE SW POS	INDICATES FAULT IN	TEST METHOD	INDICATES FAULT IN	TEST METHOD
8.	Pack temp controller	Override bridge output with signal to produce full on heating output	Zone temp controller	Override bridge output with signal to produce full on heating output
9.	Pack temp controller	Override bridge output to produce a nulled output	Zone temp controller	Override bridge output to produce a nulled output
10.	Pack discharge temp control sensor	Check output of bridge	Zone inlet temp sensor	Check output of bridge
11.	No test		Zone temp sensor	Check output of bridge
12.	No test		Zone temp selector	Check selector output signal

E. Pack Temperature Controller 11HH (10HH)
(Ref. Fig. 011)

(1)Function

There are two identical pack temperature controllers, one for each refrigeration unit pack. The controllers compare sensed pack discharge temperature against the reference signal from the APU and pack temperature demand controller to produce an error signal to drive the ram/turbine bypass valve actuator.

(2)Description

The pack temperature controller is a chassis-mounted electronic assemly mainly comprising a POWER MODULE, an INPUT MODULE, a MODULATOR MODULE, an OUTPUT MODULE and a test circuit.

The face of the controller features :

- a connector for connection to the aircraft electrical network
- a test electrical connector (to which connector from APU and pack temperature demand controller 37HK is connected).

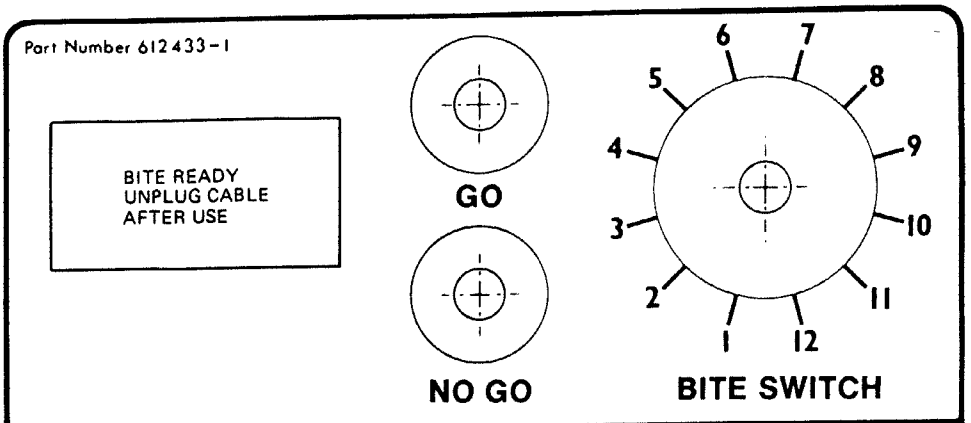
(3)Operation

(a)Power module

The module converts the 115VAC 400 Hz electrical current of the aircraft electrical network into -15VDC and +15VDC. The module also transmits a positive regulated signal (5.1VDC) to the control bridge.

(b)Input module

The module compares the signals from pack discharge temperature control sensor 15HH (14HH) against the demand signal from APU and pack temperature demand controller 37HK and generates an error signal.



OPERATING INSTRUCTIONS — TEMPERATURE CONTROL SUBSYSTEM FAULT ISOLATION

A. AT FLIGHT ENGINEER'S STATION

1. Close ALL AIR CONDITIONING BREAKERS on main circuit breaker panel.
2. Switch TRIM AIR OFF.
3. Check VALVES by manually operating selectors. If position indicator shows smooth and complete travel from cold to hot and back, valve is O.K. If valve is faulty, replace and retest. If still faulty, see maintenance manual.
4. Set SELECTORS to AUTO (middle dot) for all zones and packs.

B. AT GALLEY — Set SELECTOR to middle dot

C. ON THIS CONTROLLER

1. Connect BITE cable to controller for subsystem under test.
2. Press to test all lights, replace faulty bulbs. If none light, see maintenance manual.
3. Rotate Bite Switch clockwise 1 thru 12. At each position wait for red or green light. If GO (green) proceed to next switch position. If NO GO (red) replace unit noted in table below and restart at position 1.
4. When all positions are GO, subsystem is O.K. Disconnect and stow BITE cable.

IF NO GO LIGHT APPEARS REPLACE SUBSYSTEM L.R.U. INDICATED BELOW

Switch Position(s)	When Checking a Zone Subsystem	When Checking a Pack Subsystem
1 thru 3	Controller, Temp. Demand, APU & Pack	Controller, Temp. Demand, APU & Pack.
4 thru 9	Controller, Temp, Zone (Under test)	Controller, Temp., Pack (Under test)
10	Sensor, Temp., Pack out/Zone in	Sensor, Temp., Pack out
11	Sensor, Control, Zone Temp	No Test
12	Selector, Temp. Control, Zone (or Galley)	No Test

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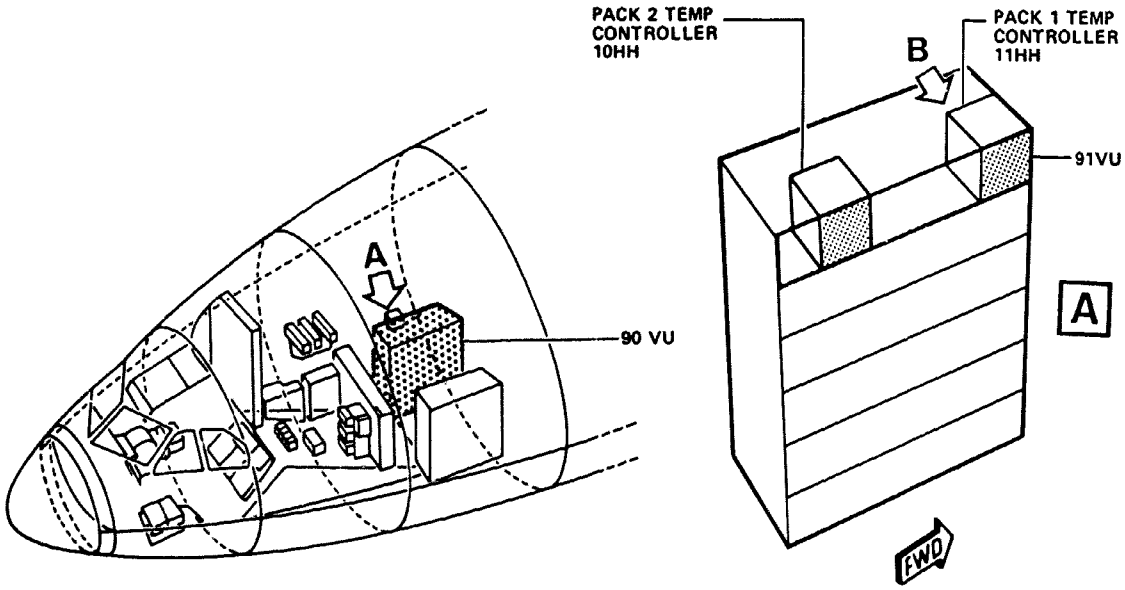
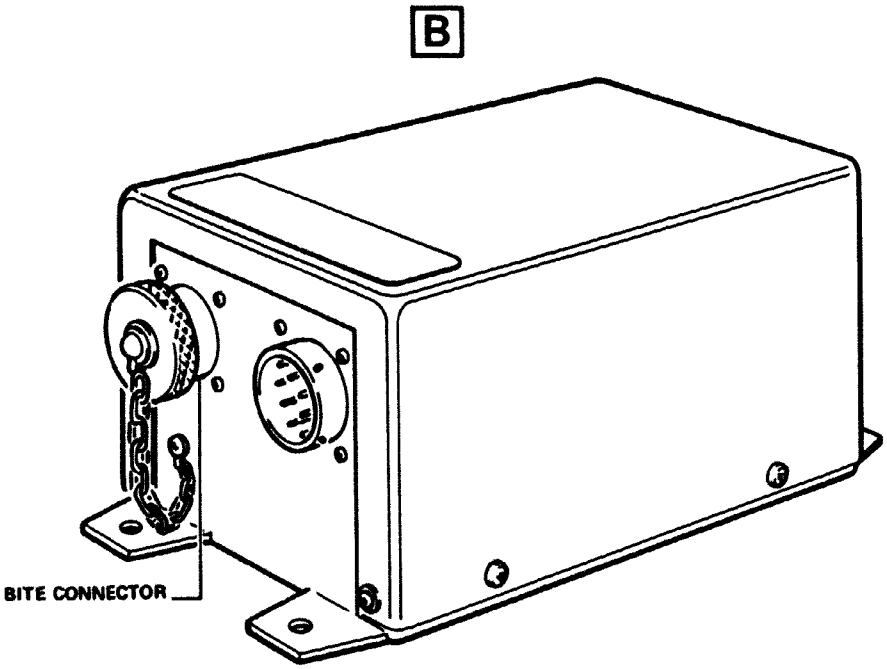
APU and Pack Temperature Demand Controller- BITE Logic Label
Figure 010





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Pack Temperature Controller
Figure 011

(c)Modulator module
The module consists of two integrated amplifier channels. It analyzes the cool and heat demand signals and transmits them to the output module.

(d)Output module
The module consists to two cool and heat demand channels.
It receives the signals from the power, input and modulator modules and transmits them to ram/turbine bypass valve actuator 17HH (16HH).
NOTE : Pack temperature controller 11HH (10HH) is no longer supplied in one of the two following cases :
- pack temperature control selected in manual mode (MAN)
- refrigeration unit pack shutdown.

F. Turbine Inlet Temperature Sensor 21WV (20WV)
(Ref. Fig. 012)
The turbine inlet temperature sensor is of the single element resistor type designed to sense the turbine inlet temperature and to transmit the information to the right ECAM display unit (display on the AIR BLEED page).

G. Pack Discharge Temperature Sensor 23WV (22WV) (Ref. Fig. 012)
The pack discharge temperature sensor is of the single element resistor type designed to sense the pack discharge temperature and to transmit the information to the right ECAM display unit (display on the AIR BLEED page).

5. Operation
(Ref. Fig. 013, 014)

A. Automatic Pack Temperature Control with PACK 1 MODE SEL and PACK 2 MODE SEL Pushbutton Switches 55HH and 56HH Pressed (In)
APU and pack temperature demand controller 37HK compares the temperature demand signals from the three cabin zones and the flight compartment and identifies the zone demanding the lowest temperature ; controller 37HK then delivers a signal to pack 1 and pack 2 temperature controllers 11HH and 10HH for regulation of the pack discharge temperature as follows :

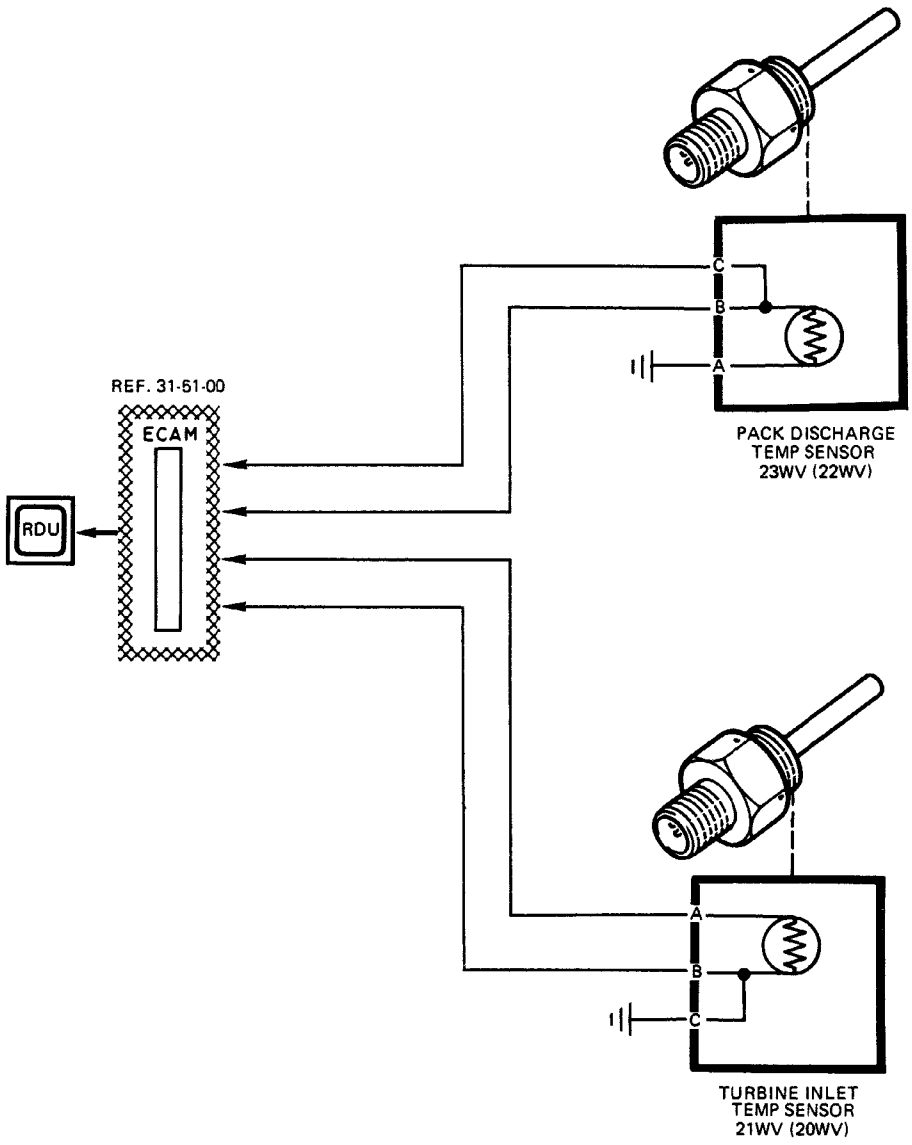
(1)At Start-up
- limitation of temperature demand to +7° at the pack outlet during three minute.

(2)Both packs operating
(a)First case : the flight compartment demands the lowest temperature
- pack 1 discharge temperature is controlled by the demand signal from the flight compartment
- pack 2 discharge temperature is controlled by the signal from the cabin zone (FWD, MID or AFT) demanding the lowest temperature.

(b)Second case : one of the three cabin zones demands the lowest temperature :
- pack 1 and pack 2 discharge temperature is controlled by the demand signal from that zone.

(3)One pack operating
The discharge temperature of the operating pack only is controlled by the zone demanding the lowest temperature.

(4)Temperature control



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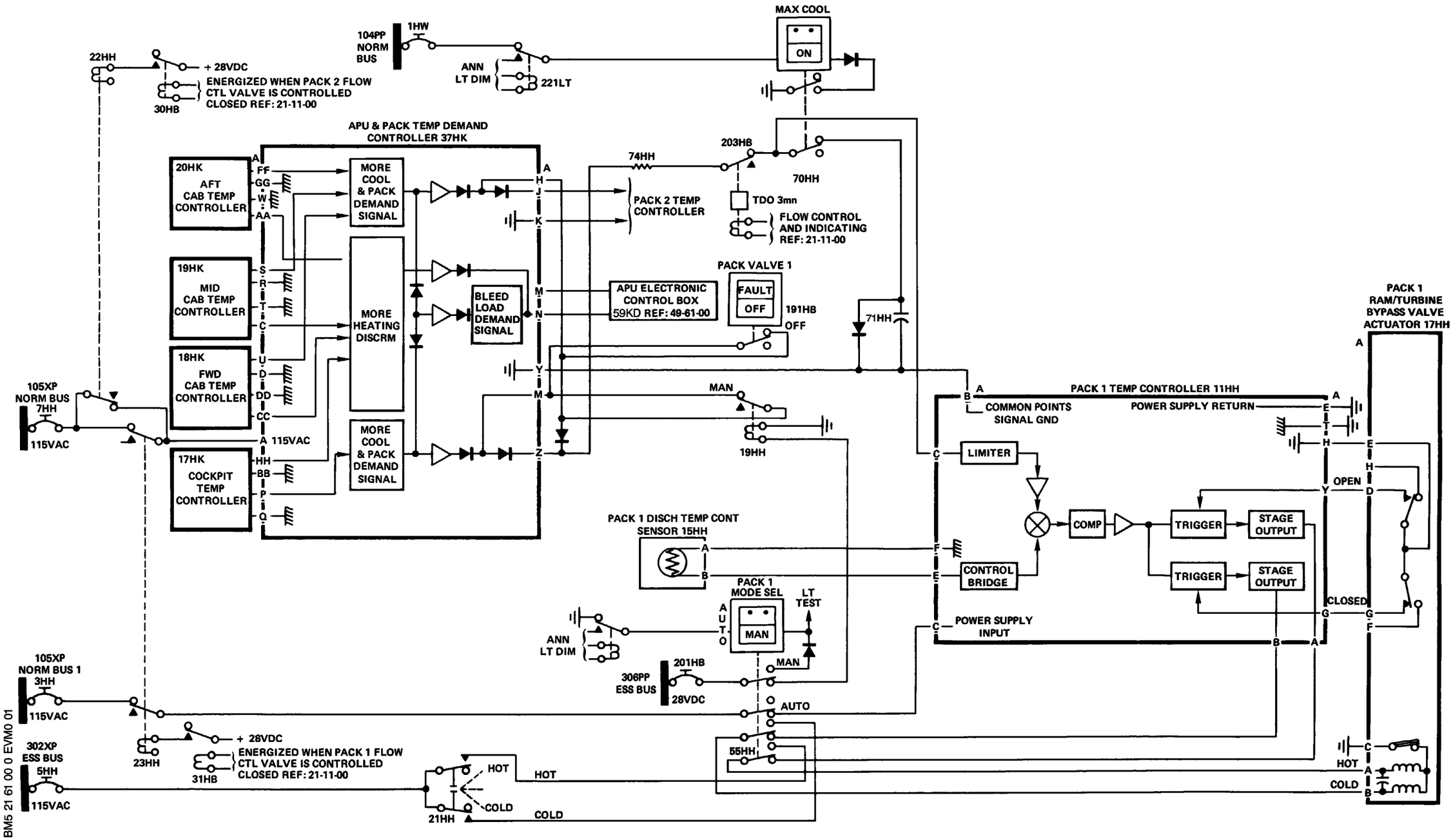
Pack Temperature Indication
Figure 012



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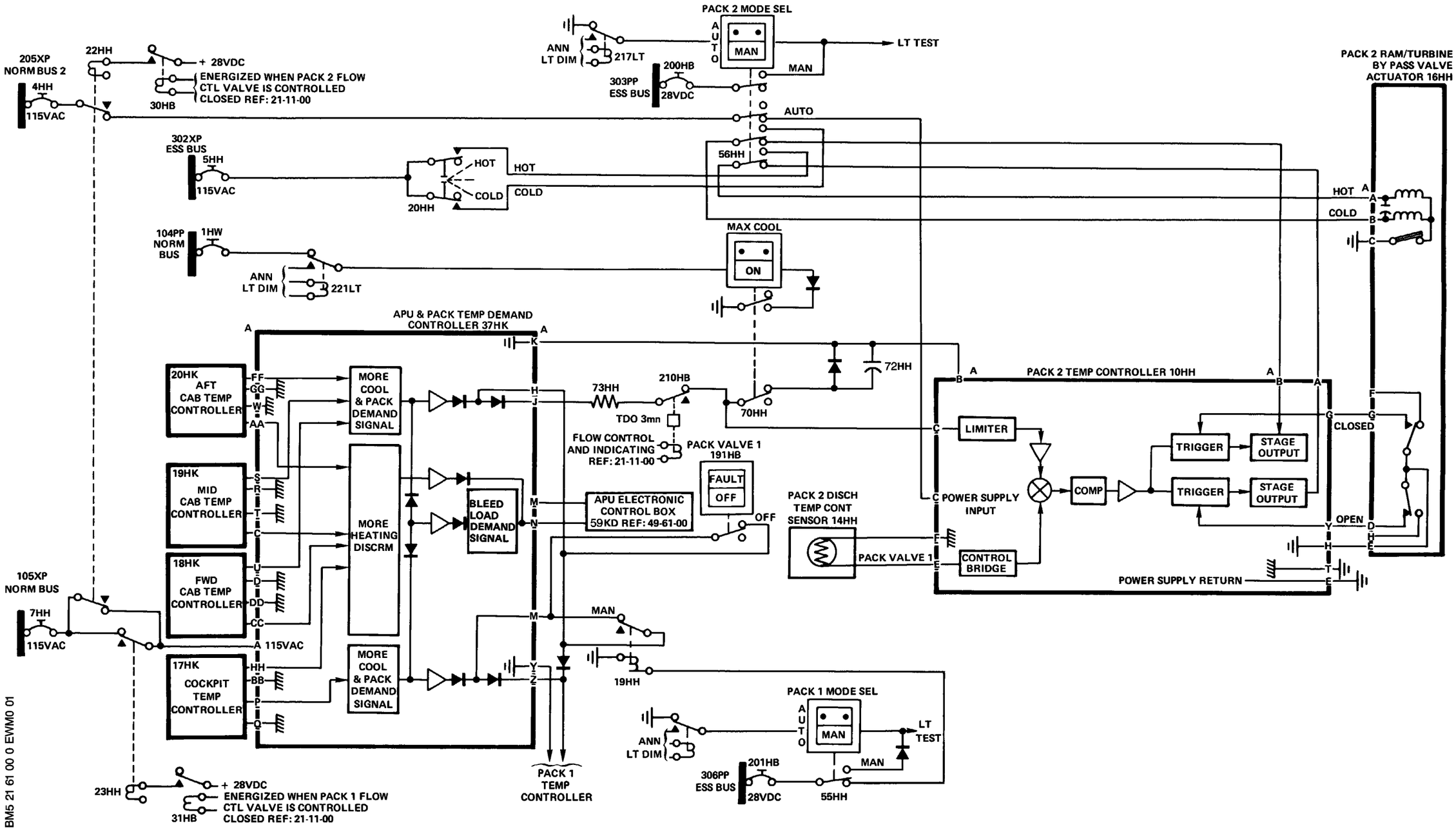
Pack 1 Temperature Control - Schematic
Figure 013

R



Pack 2 Temperature Control - Schematic
Figure 014

R

Pack temperature controller 11HH (10HH) compares pack discharge temperature signal transmitted by sensor 15HH (14HH) against the reference signal from APU and pack temperature demand controller 37HK to generate an error signal to drive ram/turbine bypass valve actuator 17HH (16HH) ; the actuator modulates the cooling air outlet modulation flap
R and via a flexible control turbine bypass valve 19WV (18WV).
For a maximum cooling demand, the turbine bypass valve is fully closed and the cooling air outlet modulation flap fully open. For a more heat demand, the turbine bypass valve opens while the cooling air outlet modulation flap closes.
For a maximum heating demand, the turbine bypass valve is fully open and the cooling air outlet modulation flap fully closed.
NOTE : If APU bleed air is used, APU and pack temperature demand controller 37HK also controls APU bleed load.

B. Manual Pack Temperature Control with PACK 1 MODE SEL (PACK 2 MODE SEL) Pushbutton Switch 55HH (56HH) Released (Out) (MAN Legend On)
In the event of automatic temperature control failure, pack 1 (2) discharge temperature control is accomplished by acting directly on ram/turbine bypass valve actuator 17HH (16HH) from PACK 1 (2) manual temperature control selector switch 21HH (20HH) ; the selector switch is spring-loaded to center position.
(1) Selector switch is placed in COLD position for a more cooling demand : actuator 17HH (16HH) drives the cooling air outlet modulation flap to the open position and the turbine bypass valve to the closed position.
(2) Selector switch is placed in HOT position for a more heating demand : actuator 17HH (16HH) drives the cooling air outlet modulation flap to the closed position and the turbine bypass valve to the open position.

1. Operational Test

A. Reason for the Job
To check for correct operation of :
- manual temperature control system
- automatic temperature control system.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Warning Notices
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure
(1)Job set-up
(a)Initial conditions :
Overhead panel circuit breakers closed, particularly those associated with **COMPT TEMP, AIR BLEED & COMPT TEMP, ECAM**
(b)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Make certain that electronics racks ventilation is correct.
(d)Display warning notices prohibiting pressurization of pneumatic system.
(e)On **COMPT TEMP** panel **437VU**
- press **PACK VALVE 1** and **PACK VALVE 2** pushbutton switches.

(f)On **PACK TEMP** panel **441VU**
- release **PACK 1 MODE SEL (PACK 2 MODE SEL)** pushbutton switch (**MAN** legend on).

(g)On **ECAM** control panel (center pedestal)
- using **RIGHT DISPLAY** knob, adjust brightness of right **ECAM** display unit
- press **BLEED** pushbutton switch
. light on **BLEED** pushbutton switch should come on
. on right **ECAM** display unit, **AIR BLEED** page is displayed.

WARNING : **MAKE CERTAIN THAT NOTHING PREVENTS OPERATION OF COOLING AIR OUTLET MODULATION FLAP.**

(2)Test
(a)Manual temperature control test

ACTION	RESULT
On **PACK TEMP** panel **441VU** 1. Place **PACK 1 (2) MAN CTL** switch in **COLD** position until arrow turbine bypass valve position reaches **C** (**AIR BLEED** page).	- cooling air outlet modulation flap opens - turbine bypass valve closes. On **AIR BLEED** page (right **ECAM** display unit) - turbine bypass valve position arrow indicates **C**.

ACTION	RESULT
2. Place PACK 1 (2) MAN CTL switch in HOT position until turbine bypass valve position arrow reaches H (AIR BLEED page).	- cooling air outlet modulation flap closes - turbine bypass valve opens (transit time of actuator/flap/ valve assembly is 44 ±8 seconds). On AIR BLEED page (right ECAM display unit). - turbine bypass valve position arrow indicates H.
3. Place PACK 1 (2) MAN CTL switch in COLD position until turbine bypass valve position arrow reaches C (AIR BLEED page).	- cooling air outlet modulation flap opens - turbine bypass valve closes (transit time of actuator/flap/ valve assembly is 44 ±8 seconds). On AIR BLEED page (right ECAM display unit). - turbine bypass valve position arrow indicates C.
4. Press PACK 1 (2) MODE SEL pushbutton switch (AUTO).	On panel 441VU - MAN legend of PACK 1 (2) MODE SEL pushbutton switch goes off.

(b)Automatic temperature control test

NOTE : Test instructions are given on the face of APU and pack temperature demand controller 37HK.

ACTION	RESULT
1. On COMPT TEMP panel 437VU - check that PACK VALVE 1 (2) push-button switch is pressed (in).	
2. On PACK 1 (PACK 2) temperature controller 11HH (10HH) - remove test connector guard - connect BITE cable from APU and pack temperature demand controller 37HK.	On APU and pack temperature demand controller - BITE READY/UNPLUG CABLE AFTER USE light comes on - GO green light comes on - NO GO red light remains off.
3. On APU and pack temperature demand controller - press NO GO light	- NO GO red light comes on.
- successively place BITE SWITCH in positions 1 to 10.	In each position - GO green light comes on

ACTION	RESULT
At each position wait for NO GO or GO indicator light to come on.	- NO GO red light remains off. Positions 1 to 3 - test of APU and pack temperature demand controller. Positions 4 to 9 - test of pack temperature controller. - Position 10 test of pack discharge temperature control sensor.
4. On COMPT TEMP panel 437VU - release PACK VALVE 1 (2) pushbutton switch	On APU and pack temperature demand controller - GO light goes off - BITE READY light goes off.
- press PACK VALVE 1 (2) pushbutton switch	On APU and pack temperature demand controller - GO light comes on - BITE READY light comes on.
5. On PACK TEMP panel 441VU - release PACK 1 (2) MODE SEL pushbutton switch	- MAN legend comes on. On APU and pack temperature demand controller - GO light goes off - BITE READY light goes off.

(3)Close-up
(a)On APU and pack temperature demand controller 37HK
- place BITE switch in position 1.
(b)On PACK 1 (PACK 2) temperature controller 11HH (10HH)
- disconnect BITE cable and stow
- install guard on test connector.
(c)On PACK TEMP panel 441VU
- press PACK 1 (2) MODE SEL pushbutton switch (AUTO) (MAN legend off).
(d)On COMPT TEMP panel 437VU
- release PACK VALVE 1 (2) pushbutton switch.
(e)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(f)Remove warning notices.
(g)Restore system and aircraft to normal operating condition.

RAM AIR OUTLET FLAP ROD - DEACTIVATION/REACTIVATION

REFERENCE : CONFIGURATION DEVIATION LIST (CDL) SECTION 6 03 21
WARNING : BEFORE PROCEEDING WITH ANY MAINTENANCE WORK ON THE AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Deactivation

A. Reason for the Job
To remove the flap rod after loss of ram air outlet flap.

B. Equipment and Materials

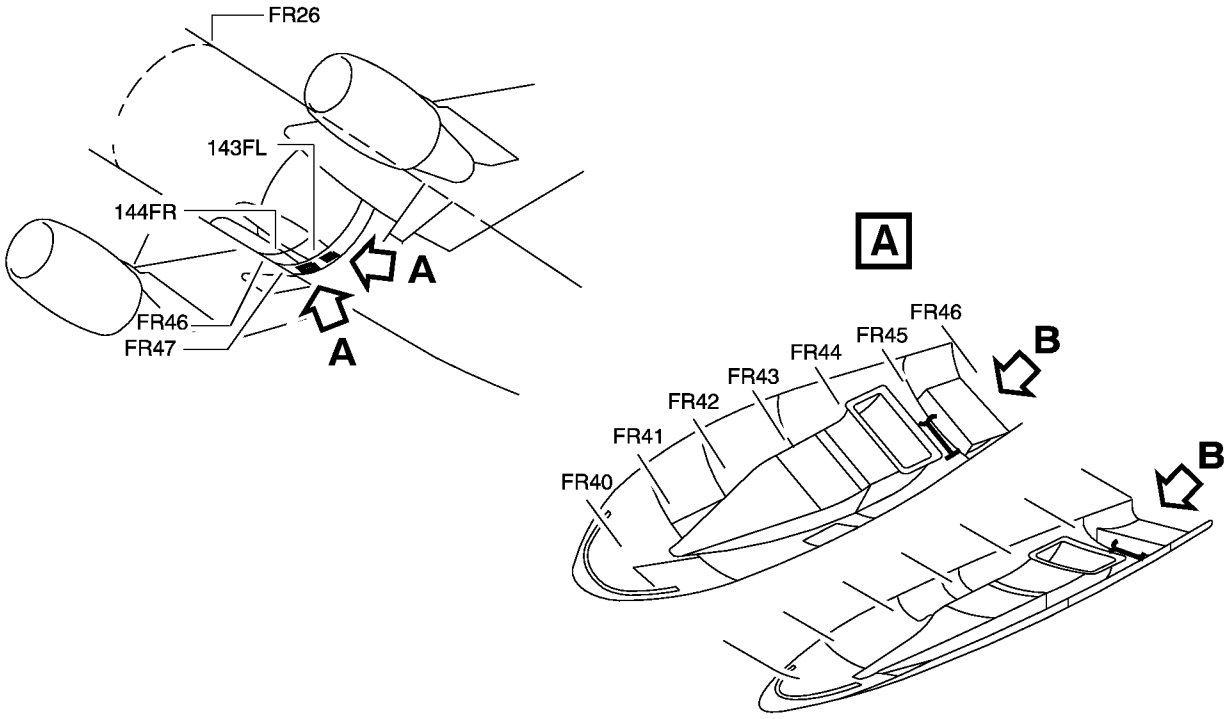
ITEM	DESIGNATION
(1)	Access Platform 2.6 m (8 ft. 7 in.)
(2)	Warning Notice
(3)	Circuit Breaker Safety Clips
Referenced Procedure - 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

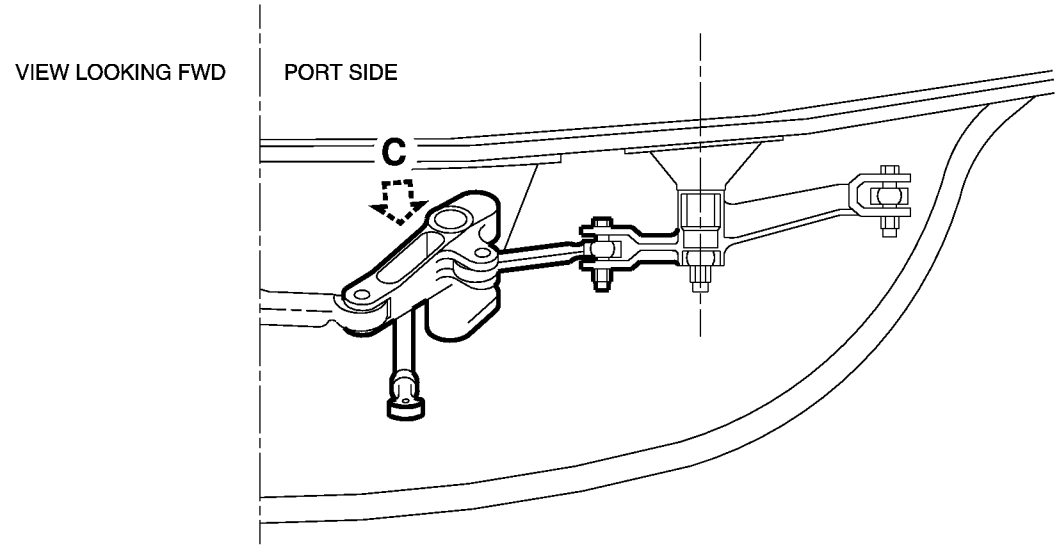
C. Procedure
(Ref. Fig. 901)
(1)Job set-up
(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP/PACK 1/MAN CTL	5HH	203/G20
22VU	COMPT TEMP/PACK 2/MAN CTL	6HH	203/G26
22VU	AIR BLEED/RAM AIR	2HZ	203/G16

(b)On COMPT TEMP panel 437VU :
- Release PACK VALVE 1 and 2 pushbutton switches
  . OFF legend comes on.
- Display a warning notice prohibiting any operation of the system.

(c)Open a main gear door (Ref. 32-12-11, P. Block 301).
(d)Position access platform.
(e)Open access door 143FL (144FR).
(2)Removal (Crank lever assy side)
(a)Remove cotter pin (2), hexagonal nut (3), flat washer (4), sliding bushes (5) and (6), countersunk washer (7) and shoulder pin (8).
(b)Remove rod (1) and package it for return to base with aircraft.
(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Close access door 143FL (144FR).





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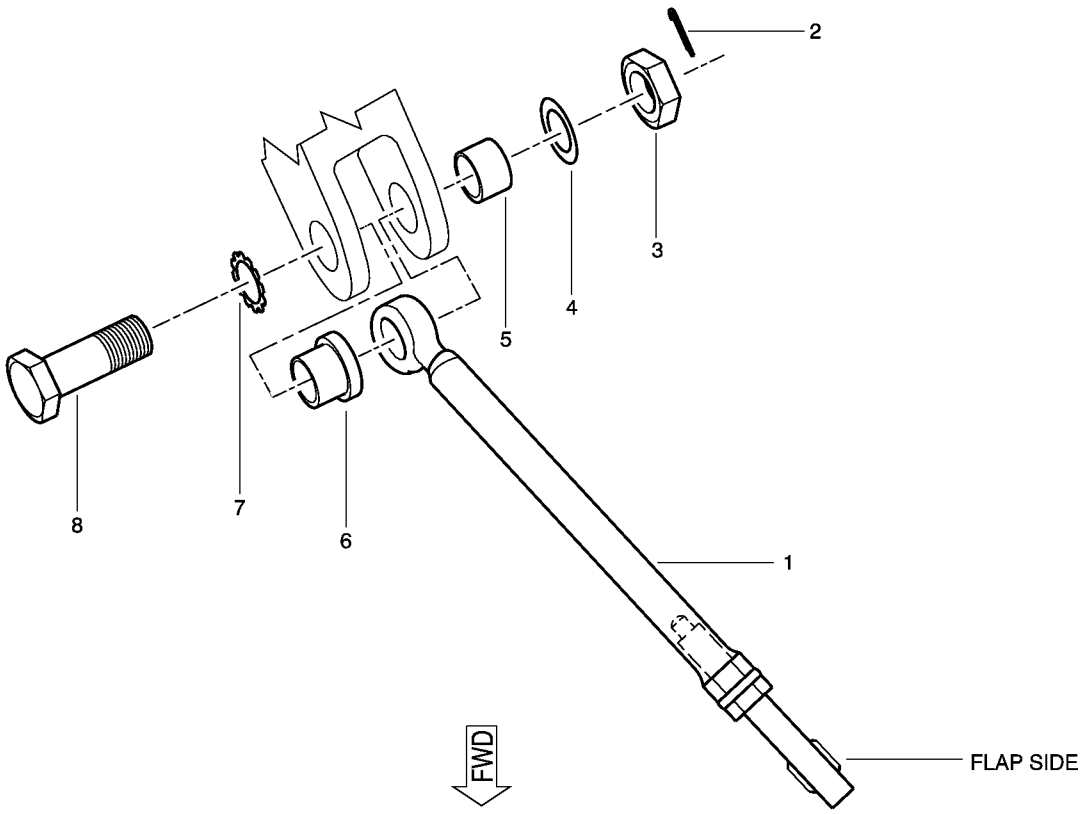
Ram Air Outlet Flap Rod
(Sheet 1/2)
Figure 901

C



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Ram Air Outlet Flap Rod
(Sheet 2/2)
Figure 901

(c)Remove access platform.
(d)Close main gear door (Ref. 32-12-11, P. Block 301).
(e)On COMPT TEMP panel 437VU :
- Press PACK VALVE 1(2) pushbutton switch
  . OFF legend goes off
  . FAULT legend comes on.
- Release PACK VALVE 1(2) pushbutton switch
  . FAULT legend goes off
  . OFF legend remains off.

(f)Make certain that actuator circuit breaker 5HH (6HH) of the lost ram air outlet flap stays open and tagged.
(g)Remove warning notice.
(h)Install a temporary placard in flight compartment to warn the flight crew that ram air outlet flap rod is missing.
(j)Make an entry in the aircraft technical log.

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.6 m (8 ft. 7 in.)
(2)	Warning Notice
(3)	Circuit Breaker Safety Clips
Referenced Procedures	
- 21-61-20, P. Block 401	Ram Air Outlet Flap - Removal/Installation
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

B. Procedure
(Ref. Fig. 901)
(1)Job set-up
(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP/PACK 1/MAN CTL	5HH	203/G20
22VU	COMPT TEMP/PACK 2/MAN CTL	6HH	203/G26
22VU	AIR BLEED/RAM AIR	2HZ	203/G16

(b)On COMPT TEMP panel 437VU :
- Make certain that PACK VALVE 1 and 2 pushbutton switches are released (out).
- Display a warning notice prohibiting any operation of the system.

(c)Open a main gear door (Ref. 32-12-11, P. Block 301).
(d)Position access platform.
(e)Open access door 143FL (144FR).
(2)Installation
(a)Install sliding bush (6).
(b)Install rod (1) (cranklever assy side).
(c)Install shoulder pin (8) with countersunk washer (7).

(d)Install sliding bush (5), flat washer (4) and hexagonal nut (3).
(e)Tighten hexagonal nut (3) and secure with cotter pin (2).
(f)Install ram air outlet flap (Ref. 21-61-20, P. Block 401).

(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Close access door 143FL (144FR).
(c)Close main gear door (Ref. 32-12-11, P. Block 301).
(d)Remove access platform.
(e)Close the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP/PACK 1/MAN CTL	5HH	203/G20
22VU	COMPT TEMP/PACK 2/MAN CTL	6HH	203/G26
22VU	AIR BLEED/RAM AIR	2HZ	203/G16

(f)On COMPT TEMP panel 437VU :
- Press PACK VALVE 1(2) pushbutton switch
  . OFF legend goes off
  . FAULT legend comes on.

(g)Remove warning notice.

TURBINE BYPASS VALVE 19WV (18WV) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Torque Wrench 0 to 0.5 m.daN (0 to 45 lbf.in.)
B.	Blanking Plugs/Caps
C.	Circuit Breaker Safety Clips
D.	Warning Notices
E.	O-Rings
Referenced Procedures	
- 32-12-11, P. Block 301	Main Gear Main Door (Ground Door(s) Opening)
- 21-61-00, P. Block 501	Pack Temperature Control

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open safety and tag the following circuit breakers :

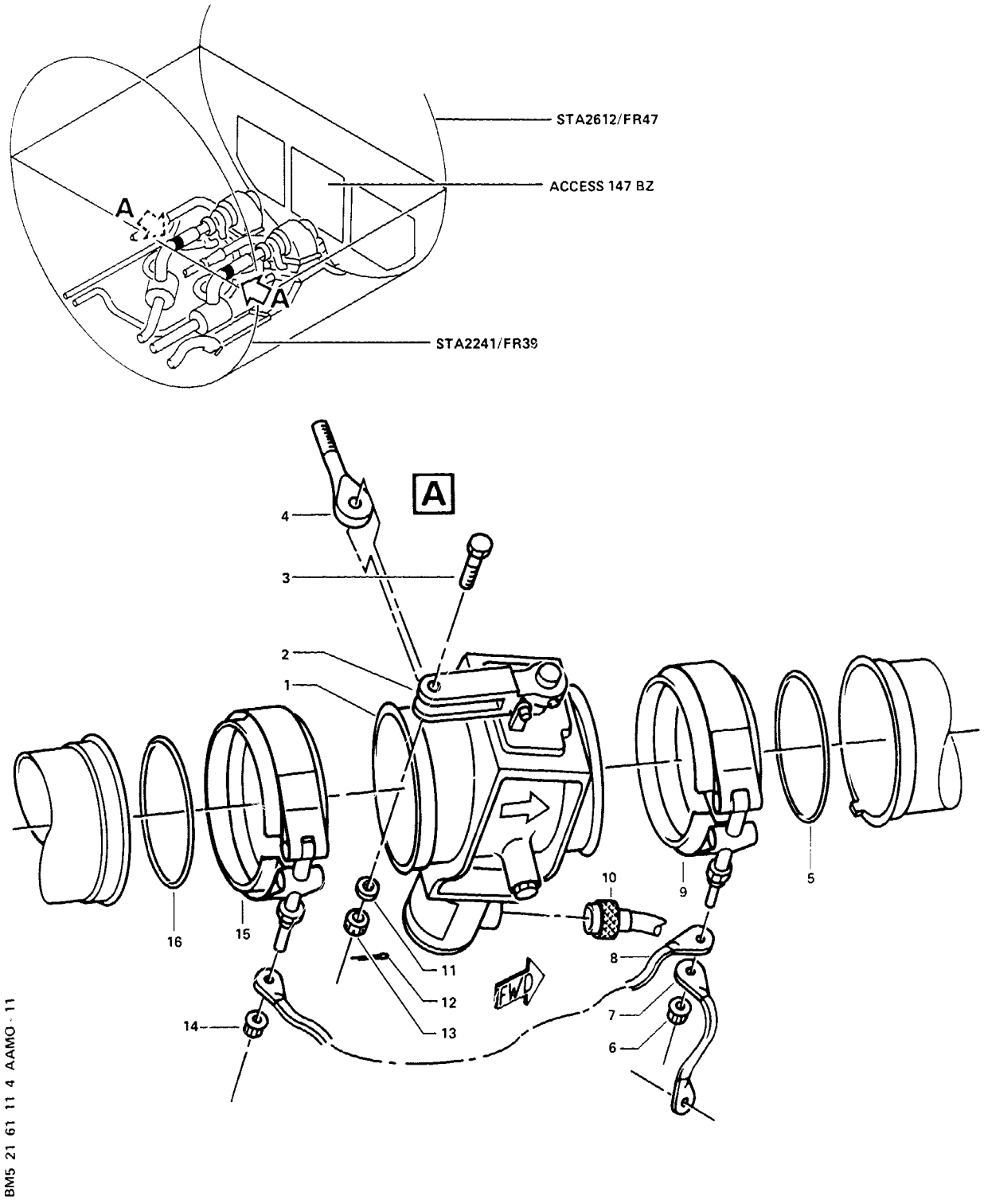
PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP/PACK 1/MAN/CTL	5HH	203/G20
22VU	COMPT TEMP/PACK 2/MAN/CTL	6HH	203/G26
131VU	AIR BLEED AND COMPT TEMP/PACK 1/ AUTO/CTL	3HH	313/F55
131VU	AIR BLEED AND COMPT TEMP/PACK 2/ AUTO/CTL	4HH	313/F57

PANEL	SERVICE	IDENT.	LOCATION
21VU	SDAC/26VAC/NORM 2	3WV2	109/A03

(2)Display a warning notice :
- prohibiting pressurization of pneumatic system
- prohibiting refrigeration unit pack start-up and any operation on the system.

(3)Open one main gear door (Ref. 32-12-11, P. Block 301).
(4)Remove access door 147BZ.

B. Removal
(1)Disconnect electrical connector (10).
(2)Remove cotter pin (12) nut (13), washer (11) and bolt (3).
(3)Remove eye end fitting (4) from arm assembly (2).
NOTE : Do not interfere with flexible control cable adjustment.
(4)Remove nuts (6) and (14) and remove bonding strips (7) and (8) from



Turbine Bypass Valve
Figure 401

clamps (9) and (15).
(5)Loosen nuts of clamps (9) and (15) and hold turbine bypass valve (1).
(6)Remove turbine bypass valve (1).
(7)Remove and discard O-rings (5) and (16).
(8)Cap open duct ends and electrical connector (10).

C. Installation
(1)Remove blanking plugs/caps from ducts and electrical connector and check for correct condition of duct flanges, electrical connectors and bonding strips.
(2)Clean and inspect bypass valve interface and/or adjacent area.
(3)Install new O-rings (5) and (16) in duct flange grooves.
(4)Install valve (1) between bypass ducts, with arrow indicating airflow direction pointing forwards.
NOTE : Valve angular setting is provided by a locating stud.
(5)Make certain that O-rings (5) and (16) are correctly installed in duct flange grooves.
(6)Install clamps (9) and (15) and tighten. TORQUE nuts to the value given on clamps.
(7)Install bonding strips (8) and (7) with nuts (14) and (6) on clamps (15) and (9). Tighten nuts (6) and (14).
(8)Position eye end fitting (4) in arm assembly (2)
(9)Install bolt (3), washer (11) and nut (13); tighten nut and safety with cotter pin (12).
(10)Connect electrical connector (10) to turbine bypass valve (1).
(11)Remove safety clips and tags and close circuit breakers 3HH, 4HH, 5HH, 6HH and 3WV2.

D. Test
Carry out an operational test of pack temperature control (Ref. 21-61-00, P. Block 501, para.1.C.(2)(a), manual temperature control test).

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/
R PANELS AT FR47.
(2)Install access door 147BZ.
(3)Close main gear door (Ref. 32-12-11, P. Block 301).
(4)Remove warning notices.

PACK TURBINE BYPASS VALVE 19WV (18WV) - DEACTIVATION/REACTIVATION

Ref. : MEL Sect. 1.21-1 (Air conditioning packs)
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.
- IDENTIFY FAILED REFRIGERATION UNIT PACK TURBINE BYPASS VALVE (TROUBLE SHOOTING).

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Deactivation

A. Equipment and Materials

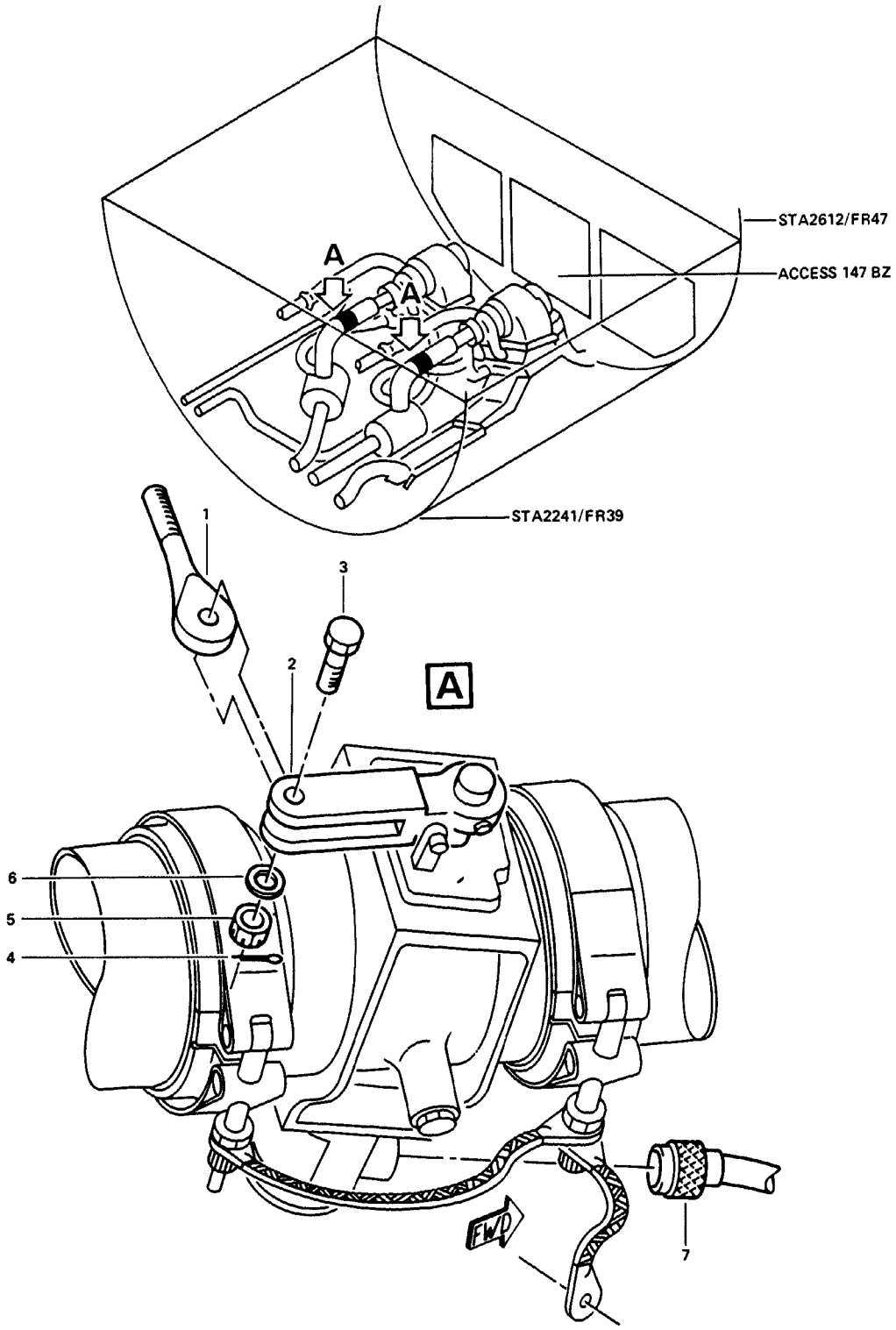
ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Warning Notice
(3)	Cotter Pin
(4)	Lockwire
Referenced Procedure - 32-12-11, P. Block 301	Main Gear Main Door-(Ground Door(s) Opening)

B. Procedure
(Ref. Fig. 901)
(1)Job set-up
(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP/PACK 1/MAN CTL	5HH	203/G20
22VU	COMPT TEMP/PACK 2/MAN CTL	6HH	203/G26
21VU	SDAC/26VAC/NORM2	3WV2	109/A03

(b)On COMPT TEMP panel 437VU
- make certain that PACK VALVE 1 and 2 pushbutton switches are released (out)
- display a warning notice prohibiting any operation of the system.

(c)Open one main gear door (Ref. 32-12-11, P. Block 301).
(d)Position access platform.
(e)Open access door 147BZ.
(2)Removal
(a)Remove cotter pin (4), nut (5), washer (6) and bolt (3).
(b)Disengage eye end fitting (1) from arm assembly (2).
NOTE : Do not interfere with flexible control cable adjustment.
(c)Loosely assemble bolt (3), washer (6), nut (5) to arm assembly (2) and secure with cotter pin (4).
(d)Move valve arm assembly (2) to fully OPEN position and wirelock.



Pack Turbine Bypass Valve
Figure 901

(e)Stow flex-shaft.
NOTE : Flex-shaft will still continue to move when the ram/turbine bypass valve actuator is operated.
Make certain that stowed flex-shaft cannot foul during movement.
Turbine bypass valve position is indicated on R ECAM display unit (AIR BLEED page).

(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS
R DOORS/PANELS AT FR47.
(b)Close access door 147BZ.
(c)Remove access platform.
(d)Close main gear door (Ref. 32-12-11, P. Block 301).
(e)Remove safety clips and tags and close circuit breakers 5HH, 6HH and 3WV2.
(f)On PACK TEMP panel 441VU
- Select PACK 1 (PACK 2) MODE SEL pushbutton switch AUTO.
(g)Remove the warning notice.
(h)Install a temporary placard in flight compartment to warn the flight crew that pack 1 (pack 2) turbine bypass valve is deactivated.
(i)Make an entry in the aircraft technical log.

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.6 m (8 ft. 7 in.)
(2)	Cotter Pin
Referenced Procedure - 32-12-11, P. Block 301	Main Gear Main Door-(Ground Door(s) Opening)

B. Procedure (Ref. Fig. 901)
(1)Job set-up
(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP/PACK 1/MAN CTL	5HH	203/G20
22VU	COMPT TEMP/PACK 2/MAN CTL	6HH	203/G26
21VU	SDAC/26VAC/NORM2	3WV2	109/A03

(b)On COMPT TEMP panel 437VU
- make certain that PACK VALVE 1 and 2 pushbutton switches are released (out)
- display a warning notice prohibiting any operation of the system.
(c)Open one main gear door (Ref. 32-12-11, P. Block 301).
(d)Position access platform.

(e)Open access door 147BZ.

(2)Installation

(a)Remove lockwire from arm assembly (2).

(b)Remove cotter pin (4), nut (5), washer (6) and bolt (3) from arm assembly (2).

(c)Position eye-end fitting (1) in arm assembly (2).

(d)Install bolt (3), washer (6), nut (5); tighten nut and safety with cotter pin (4).

(e)Remove safety clips and tags and close circuit breakers 5HH, 6HH and 3WV2.

(f)Troubleshoot the system (Ref. TSM 21-61-00).

(3)Close-up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS
R DOORS/PANELS AT FR47.

(b)Close access door 147BZ.

(c)Remove access platform.

(d)Close main gear door (Ref. 32-12-11, P. Block 301).

(e)On PACK TEMP panel 441VU

- select PACK 1 (PACK 2) MODE SEL pushbutton switch AUTO.

(f)Remove warning notice and temporary placard.

(g)Clear technical log.

RAM/TURBINE BYPASS VALVE ACTUATOR 17HH (16HH) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking Plugs/Caps
C.	Warning Notices
Referenced Procedure - 21-61-00, P. Block 501	Pack Temperature Control

2. Procedure
(Ref. Fig. 401)

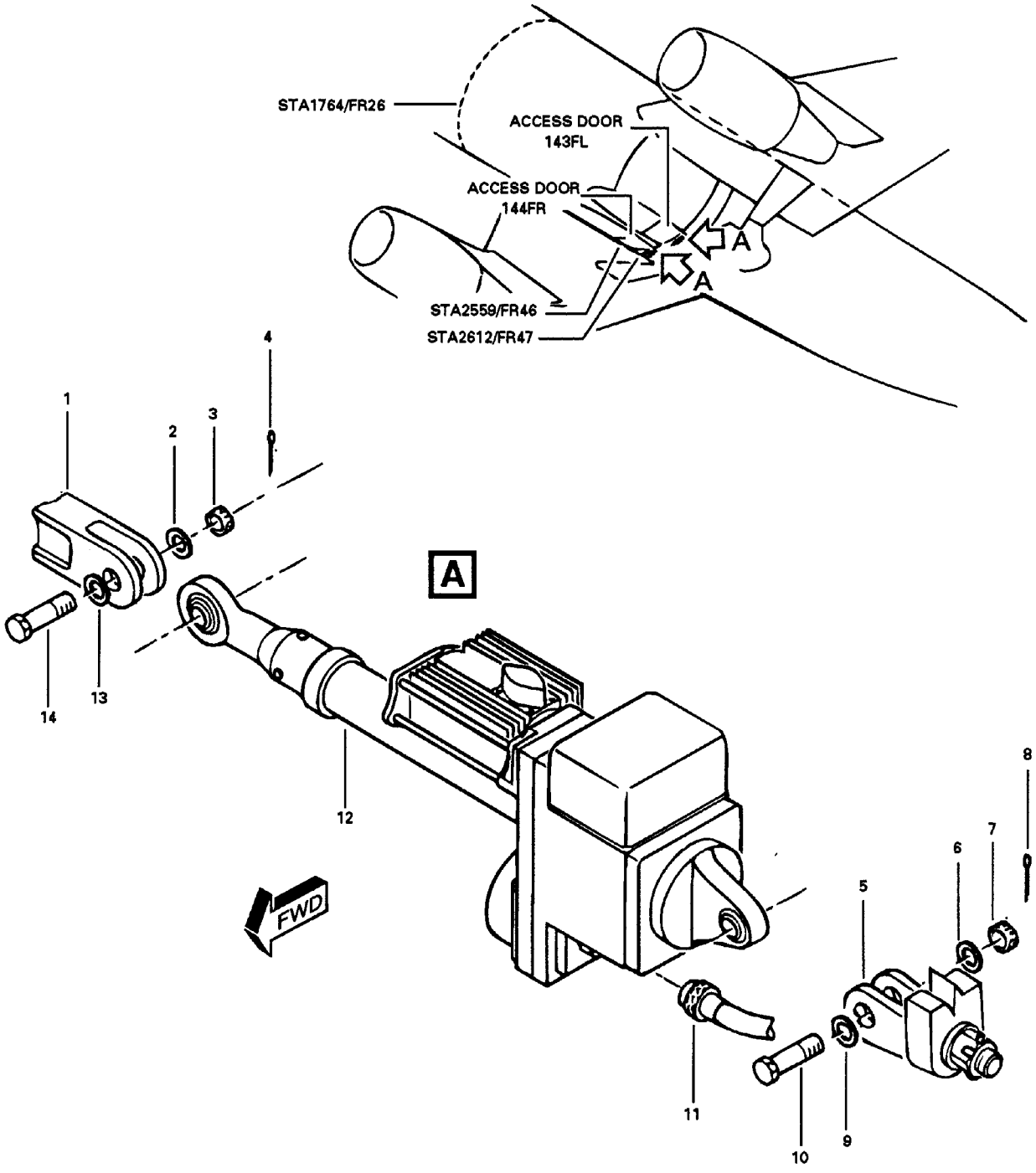
A. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP/PACK 1/MAN CTL	5HH	203/G20
22VU	COMPT TEMP/PACK 2/MAN CTL	6HH	203/G26
131VU	AIR BLEED & COMPT TEMP/PACK 1/AUTO CTL	3HH	313/F55
131VU	AIR BLEED & COMPT TEMP/PACK 2/AUTO CTL	4HH	313/F57

(2)Display warning notices prohibiting pressurization of pneumatic system
(3)Remove access door 143FL (144FR).

B. Removal
(1)Disconnect electrical connector (11).
(2)Remove cotter pin (4), nut (3), washer (2) and (13), and bolt (14).
(3)Remove cotter pin (8), nut (7), washer (6) and (9), and bolt (10).
NOTE : Do not interfere with control arm adjustment.
(4)Remove ram/turbine bypass valve actuator (12).
(5)Cap electrical connector (11).

C. Installation
(1)Clean and inspect actuator (12) interface and/or adjacent area.
(2)Install actuator between control arm (1) and support (5) fork ends.
(3)Install bolt (10), washer (6) and (9), and nut (7).
(4)Remove blanking cap and check for correct condition of electrical connector (11).
(5)Install bolt (14) washer (2) and nut (3), tighten nuts (3) and (7) and safety with cotter pins (4) and (8).
(6)Connect electrical connector (11) to ram/turbine bypass valve actuator



Ram/Turbine Bypass Valve Actuator
Figure 401

(12).

(7)Remove safety clips and tags and close circuit breakers 5HH, 6HH, 3HH and 4HH.

D. Test

Carry out an operational test of pack temperature control (Ref. 21-61-00, P. Block 501, para. 1.C.(2)(a), manual temperature control test).

E. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Install access door 143FL (144FR).

(3)Remove warning notices.

RAM/TURBINE BYPASS VALVE ACTUATOR 17HH (16HH) - DEACTIVATION/REACTIVATION

Ref. : MEL Sect. 1-21, 2b (regulator flap/turbine by-pass valve actuation)
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.
WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED. BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Deactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Blanking Plugs/Caps
(3)	Tape
(4)	Corrosion Resistant Steel Lockwire, Dia. 1 mm (0.40 in.)
(5)	Warning Notice

B. Procedure

(Ref. Fig. 901)

(1) Job set-up

(a) Open, safety and tag the following circuit breaker :

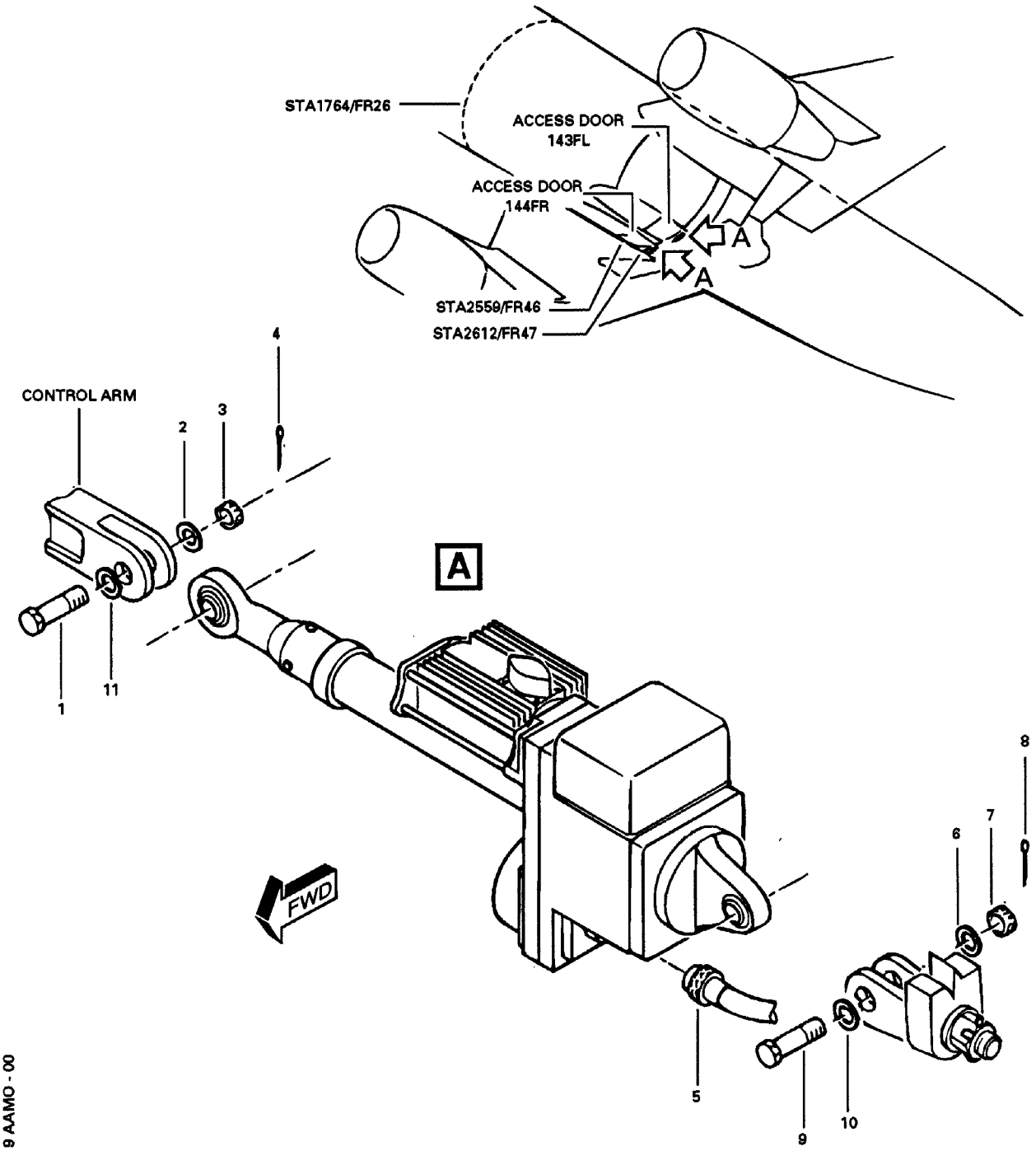
PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP/PACK 1/MAN CTL	5HH	203/G20
22VU	COMPT TEMP/PACK 2/MAN CTL	6HH	203/G26

(b) On COMPT TEMP panel 437VU
- make certain that PACK VALVE 1 and 2 pushbutton switches are released (out).
- display a warning notice prohibiting any operation of the system.

(c) Open access door 143FL (144FR).

(2) Removal

(a) Remove cotter pin (4), nut (3), washer (2) and (11), and bolt (1).
(b) Remove cotter pin (8), nut (7), washer (6) and (10), and bolt (9).
(c) Slightly lift the actuator, disconnect electrical connector 17HH-A (16HH-A) (5).
(d) Remove actuator and package it for return to base with aircraft.
(e) Cap electrical connector (5).
(f) Stow electrical cable and secure with tape.
(g) Loosely assemble bolt (1), washer (2) and (11), nut (3) to control arm fork end and secure with cotter pin (4).
(h) Loosely assemble bolt (9), washer (6) and (10), nut (7) to actuator support fork end and secure with cotter pin (8).



Ram/Turbine Bypass Valve Actuator
Figure 901

(i)Move control arm to close turbine bypass valve (cooling air outlet modulation flap opens) and secure with lockwire (double strand, twisted together between actuator attachment bolts).
(j)Turbine bypass valve position is indicated on R ECAM display unit (AIR BLEED page).

(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Close access door 143FL (144FR).
(c)Remove warning notice.
NOTE : The circuit breaker for the deactivated actuator is to be left open, safetied and tagged.
(d)Install a temporary placard in the flight compartment to warn the flight crew that ram/turbine bypass valve actuator 17HH (16HH) is deactivated.
(e)Make an entry in the aircraft technical log.

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.6 m (8 ft. 7 in.)
(2)	Circuit Breaker Safety Clips
(3)	Cotter Pins

B. Procedure (Ref. Fig. 901)
(1)Job set-up
(a)On COMPT TEMP panel 437VU
- make certain that PACK VALVE 1 and 2 pushbutton switches are released (out).
- display a warning notice prohibiting any operation of the system.

(b)Open access door 143FL (144FR).

(2)Installation
(a)Cut and remove lockwire securing control arm.
(b)Remove cotter pin (4) from control arm fork-end and remove nut (3), washer (2) and (10), and bolt (1).
(c)Remove cotter pin (8) from actuator support fork end and remove nut (7), washer (6) and (10), and bolt (9).
(d)Install actuator between control arm and support fork ends.
(e)Install bolt (1), washer (2) and (11), nut (3); tighten nut and secure with cotter pin (4).
(f)Install bolt (9), washer (6) and (10), nut (7); tighten nut and secure with cotter pin (8).
(g)Remove blanking plugs/caps from electrical plug and receptacle.
(h)Connect electrical connector (5) 17HH-A (16HH-A) to actuator.
(i)Remove safety clip and tag and close circuit breaker 5HH (6HH).
(j)Troubleshoot the system (Ref. TSM 21-61-00).

(3)Close-up
(a)Make certain that working area is clean and clear of tools and

miscellaneous items of equipment.
(b)Close access door 143FL (144FR).
(c)Remove warning notice.
(d)Clear technical log.

TURBINE BYPASS VALVE FLEXIBLE CONTROL - REMOVAL/INSTALLATION

R

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Torque Wrench 0.2 m.daN (18 lbf. in.)
B.	Circuit Breaker Safety Clips
C.	Lockwire Dia. 0.8 mm (0.032 in.)
D.	Warning Notices
E. Material No. 04-004	Common Greases (Ref. 20-31-00)
F. Material No. 11-003	Cleaning Agents (Ref. 20-31-00)
G. Material No. 11-005A	Cleaning Agents (Ref. 20-31-00)
Referenced Procedures	
- 21-61-00, P. Block 501	Pack Temperature Control
- 32-12-11, P. Block 301	Main Gear Main Door - Ground Door(s) Opening
- 24-41-00, P. Block 301	AC External Power Control

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open, safety ant tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP/PACK1/MAN CTL	5HH	203/G20
22VU	COMPT TEMP/PACK2/MAN CTL	6HH	203/G26
131VU	AIR BLEED & COMPT TEMP/PACK1/AUTO CTL	3HH	313/F55
131VU	AIR BLEED & COMPT TEMP/PACK2/AUTO CTL	4HH	313/F57

(2)Display warning notices prohibiting pressurization of pneumatic system.
(3)Open main gear main door (Ref. 32-12-11, P. Block 301).
(4)Open access door 147BZ.
(5)Remove access door 143FL (144FR).

B. Removal
WARNING : PRIOR TO REMOVAL OF TUBE, MAKE A CONTOUR JIG, OR TAKE CARE NOT TO DAMAGE THE REMOVED TUBE SO AS TO USE IT AS A CONTOUR JIG TO SHAPE THE REPLACEMENT TUBE.
(1)Remove cotter pin (4), remove nut (3), washer (2) and bolt (1).
(2)Remove cotter pin (25), nut (24), washers (22) and bolt (23).
(3)Disengage rod end (5) from turbine bypass valve control arm ; cut and remove lockwire and loosen locknut (7).

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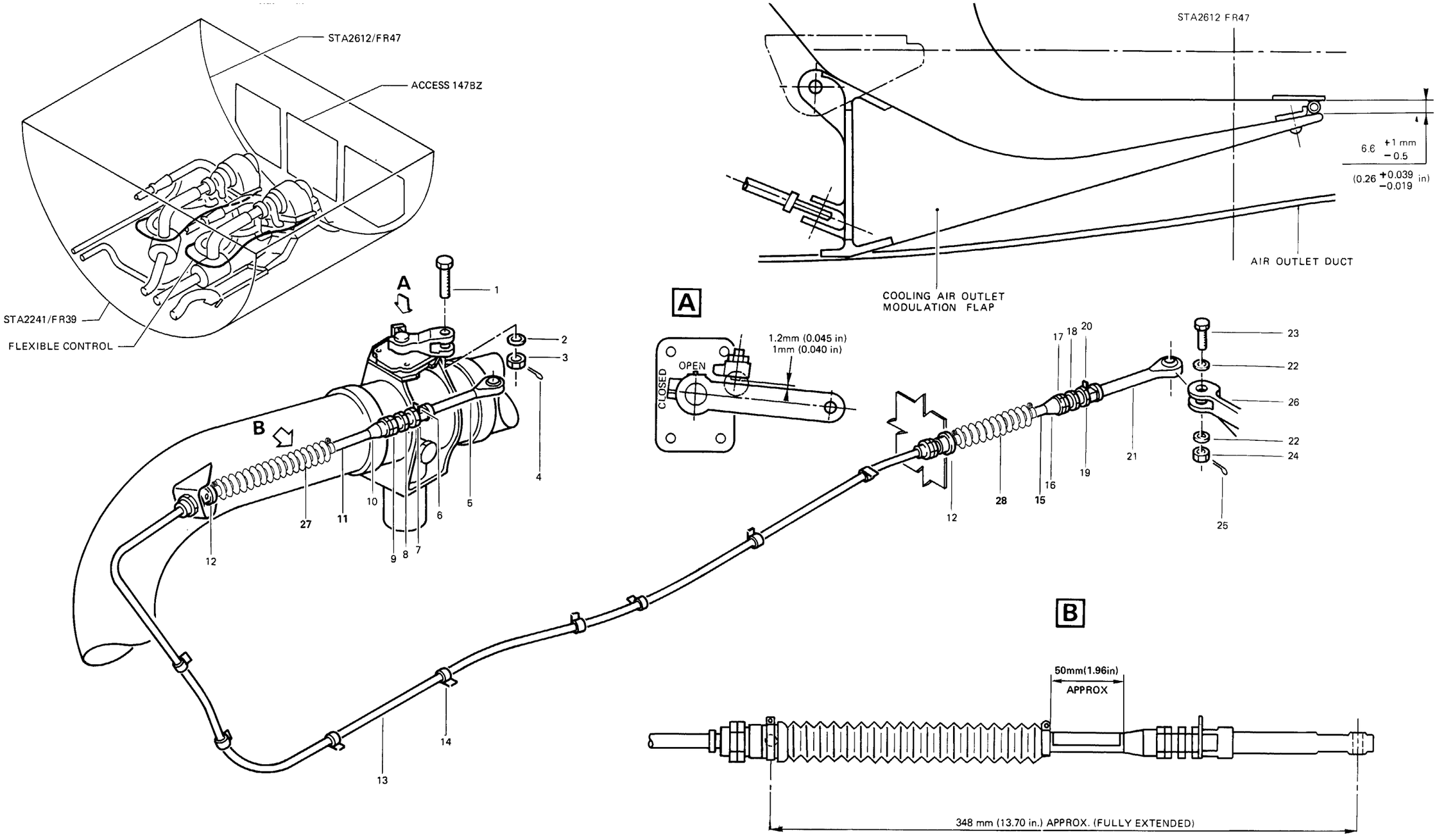

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Turbine Bypass Valve Flexible Control
Figure 401

(4)Loosen locknut (9), unscrew tightening cone (10) and slide sliding tube (11) to free cable.
(5)Unscrew cable from threaded end fitting (8) ; remove rod end (5).
(6)Remove clamps at each end of bellows (27).
(7)Remove sliding tube (11), remove bellows (27).
(8)Cut and remove lockwire, loosen locknuts (19) and (17) and unscrew tightening cone (16).
(9)Slide sliding tube (15) to free cable.
(10)Unscrew cable from threaded end fitting (18) ; remove rod end (21).
(11)Remove clamps at each end of bellows (28).
(12)Remove sliding tube (15), remove bellows (28).
(13)From one end, pull cable until cable is completely disengaged from tube (13).
(14)Cut and remove lockwire, loosen nuts securing swivel fittings (12) and remove swivel fittings (12).
(15)Remove the eight clamps (14) and tube (13).

C. Preparation of Replacement Component
(1)Shape tube as per contour jig made prior to removal or as per removed tube.
(2)Make certain that tube is correctly shaped : check that a steel ball of diameter approximately equal to inner diameter of tube can pass freely through full length of shaped tube.

D. Cable and Tube Cleaning Procedure
(1)Degrease cable with Cleaning Agent (Material No. 11-003).
(2)Dry cable with compressed air or nitrogen.
(3)Grease cable with Common Grease (Material No. 04-004).
(4)Inject Cleaning Agent (Material 11-005A) through one end of the tube (13). Put a clean adsorbent paper at the other end.
(5)Blow dry air or nitrogen through one end of the tube(13). Repeat the operation until all dirty liquid is removed. Drying is needed to avoid the risk of freezing due to any residual moisture.

E. Installation
(1)Install tube (13) and secure with the eight clamps (14).
(2)Install and secure the two swivel fittings (12), tighten locknuts and wirelock.
(3)Apply a thin coat of Material No. 04-004 to cable and insert cable into tube (13).
NOTE : Prior to installation of cable, check cable over full length for correct condition of coils, for wear and distortion.
(4)Install bellows (27) and (28) on sliding tubes (11) and (15). Install sliding tubes. Install and tighten clamps at each end of bellows, making certain that there is a distance of 50 mm (1.96 in.) between cones (10) or (16) and extremity of bellows (27) and (28).
(5)Fully screw cable into threaded end fitting (8) then back off 10 mm (0.39 in.).
(6)Fully screw locknut (9) onto threaded end fitting (8).
(7)Screw cone (10) onto threaded end fitting (8) and tighten ; TORQUE to 0.2 m.daN (18 lbf. in.).

(8)Safety by tightening locknut (9).
(9)Fully screw locknut (7) onto threaded end fitting (8).
(10)Install rod end (5) on threaded end fitting (8) and slightly tighten locknut (7).
(11)Place turbine bypass valve in closed position and install a 1 mm (0.040 in.) shim between valve mechanical stop and control arm. (Ref. Fig. 401)
(12)Engage rod end (5) eye fitting in turbine bypass valve control arm fork fitting.
(13)Adjust length of valve flexible control so that flexible control attachment bolt (1) can be readily installed in turbine bypass valve control arm fork fitting.
NOTE : Do not adjust mechanical stop of turbine bypass valve.
(14)Install washer (2) and nut (3) on bolt (1). Tighten nut (3) and safety with cotter pin (4).
(15)Make certain that dimension between rod end (5) eye fitting center-to--swivel fitting (12) rotation axis is 348 mm (13.70 in.) approx.
(16)Tighten locknut (7) and fold back lockwasher (6) onto flat of rod end (5).
(17)On cooling air outlet modulation flap side, screw cable into threaded end fitting (18) ; fully screw locknut (17) onto threaded end fitting (18),
(18)Screw cone (16) onto threaded end fitting (18) ; tighten cone and TORQUE to 0.2 m.daN (18 lbf.in.) ; safety by tightening locknut (17).
(19)Fully screw locknut (19) onto threaded end fitting (18) ; install rod end (21) and slightly tighten locknut (19).
(20)Check that actuator is extended with cooling air outlet modulation flap in fully closed position (seal correctly seated on air outlet duct). (Ref. Fig. 401)
(21)If actuator is not extended, proceed as follows :
(a)Initial conditions :
- overhead panel circuit breakers closed particularly those associated with COMPT TEMP, AIR BLEED & COMPT TEMP
- correct electrical power supply
- forward services ventilation system in operation.
(b)On COMPT TEMP panel 437VU
- release PACK VALVE 1 and PACK VALVE 2 pushbutton switches.
(c)On PACK TEMP panel 441VU
- check that PACK IND SEL switch is in position 1 (2)
- release PACK 1 MODE SEL (PACK 2 MODE SEL) pushbutton switch (MAN legend on).
(d)Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP/PACK1/MAN/CTL	5HH	203/G20
22VU	COMPT TEMP/PACK2/MAN/CTL	6HH	203/G26

(e)Operation of turbine bypass valve actuator

ACTION	RESULT
On PACK TEMP panel 441VU - place PACK 1 manual temperature control selector switch in HOT position until extension of actuator.	Actuator extends.

(f)Open, safety and tag circuit breaker 5HH (6HH).
(22)With cooling air outlet modulation flap in position described in paragraph D. (20), pull flexible control rod end (21) to move turbine bypass valve to open position.
Engage flexible control rod end (21) eye fitting in bellcrank (26) fork fitting.
(23)Adjust length of flexible control rod end so that attachment bolt (23) equipped with washer (22) can be readily installed in bellcrank (26) fork fitting.
(24)Install second washer (22) and nut (24).
(25)Fully tighten nut (24) and safety with cotter pin (25).
(26)Tighten locknut (19) and fold back lockwasher (20) onto flat of rod end.

F. Test
(1)Perform an operational test of pack temperature control (Ref. 21-61-00, P. Block 501, paragraph (2) (a)).

G. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Install access door 143FL (144FR).
R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/
R PANELS AT FR47.
(3)Close access door 147BZ.
(4)Close main gear door (Ref. 32-12-11, P. Block 301).

PACK TEMPERATURE CONTROLLER 11HH (10HH) - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking Plugs/Caps

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	AIR BLEED & COMPT TEMP/PACK 1/AUTO CTL	3HH	313/F55
131VU	AIR BLEED & COMPT TEMP/PACK 2/AUTO CTL	4HH	313/F57

(2)Open access door 121BL.

B. Removal

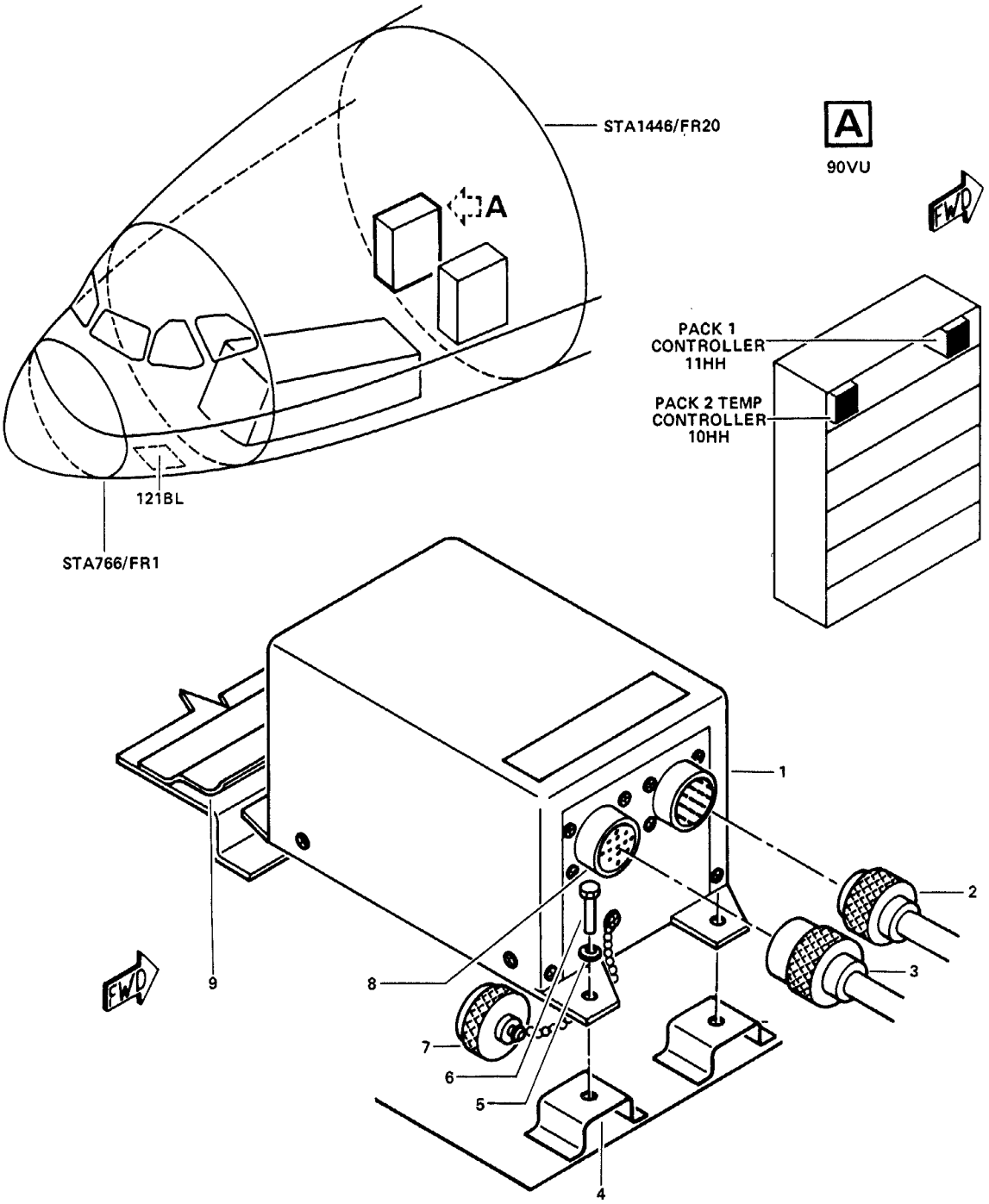
(1)Disconnect electrical connector (2).
(2)Disconnect, if connected, test connector (3) from BITE connector (8) and connect to stowage connector provided on rack structure.
(3)Remove the two screws (6) and washers (5).
(4)Slightly lift front of pack temperature controller (1) and free from attachment flange (9).
(5)Remove pack temperature controller (1).
(6)Blank off electrical connector (2) and BITE connector (8) using blanking cap (7).

C. Installation

(1)Clean and inspect pack temperature controller interface and/or adjacent area.
(2)Remove blanking cap from electrical connector (2) and check for correct condition of connector.
(3)Position pack temperature controller (1) on its support (4).
(4)Engage attachment lugs of pack temperature controller (1) in attachment flange (9).
(5)Install the two screws (6) and washers (5) and tighten.
(6)Connect electrical connector (2).
NOTE : Remove blanking plug (7) from BITE connector (8) if test connector (3) is to be connected.
(7)Remove safety clips and tags and close circuit breakers 3HH and 4HH.

D. Test Carry out automatic temperature control test (Ref. 21-61-00, P. Block 501).

E. Close-Up



BM5 21 61 15 4 AAMO 21-16
DM5

Pack Temperature Controller
Figure 401

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 121BL.
(3)De-energize the aircraft electrical network and disconnect electrical ground power unit.
(4)Restore system and aircraft to normal operating condition.

APU AND PACK TEMPERATURE DEMAND CONTROLLER 37HK
REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking Plugs/Caps

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP/COCKPIT & MID CABIN/AUTO CTL	4HK	313/F54
131VU	COMPT TEMP/COCKPIT & MID CABIN/MAN CTL	3HK	313/F53
131VU	COMPT TEMP/FWD & AFT CABIN/AUTO CTL	7HK	313/F58
131VU	COMPT TEMP/FWD & AFT CABIN/MAN CTL	6HK	313/F52

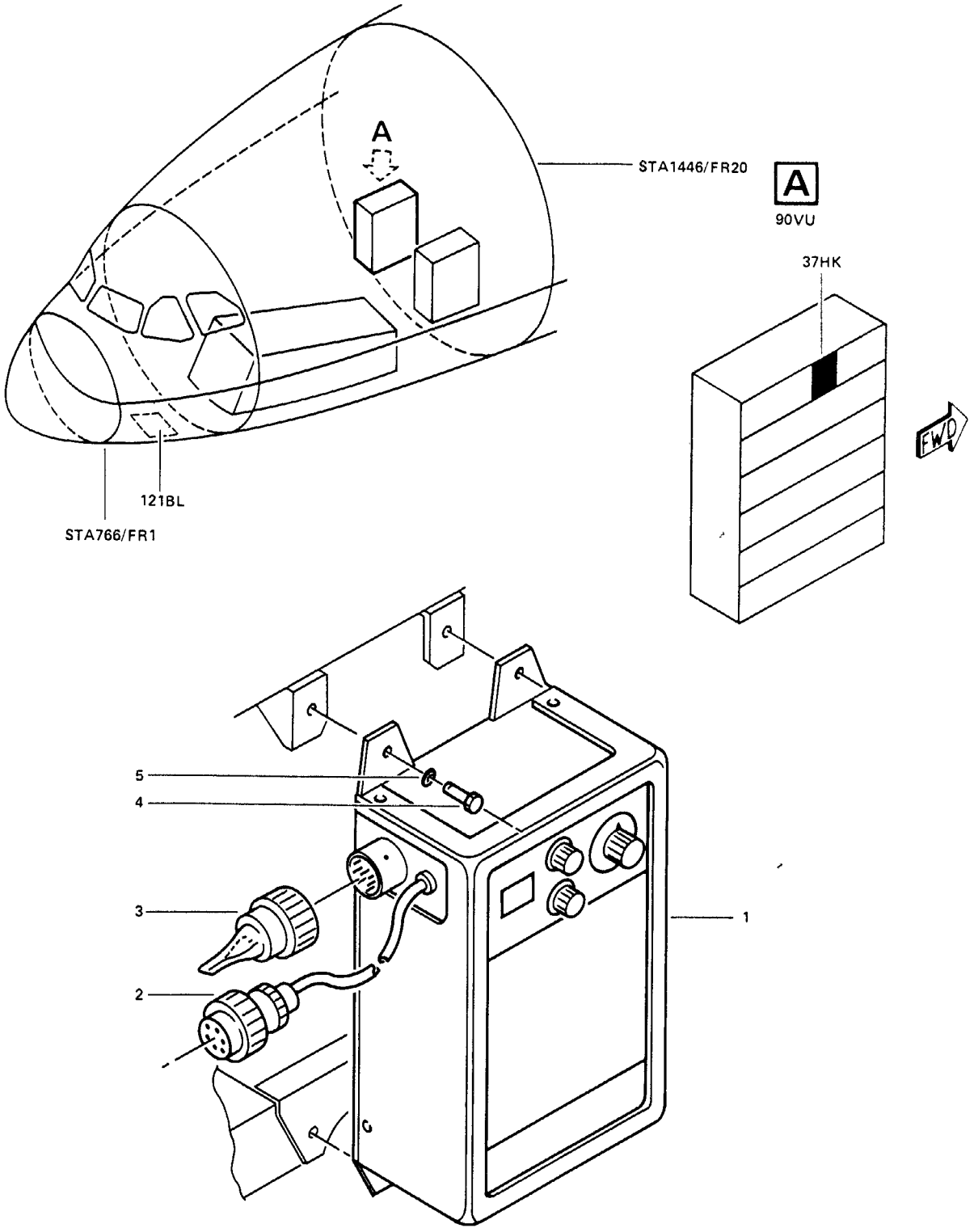
(2)Open access door 121BL.

B. Removal
(1)Disconnect electrical connector (3).
(2)Disconnect BITE cable (2) from rack structure.
(3)Loosen and remove screws (4), remove washers (5).
(4)Remove APU and pack temperature controller (1) being careful not to damage electrical connectors.
(5)Cap electrical connectors.

C. Installation
(1)Clean and inspect controller interface and/or adjacent area.
(2)Remove blanking plugs/caps from electrical connectors and check for correct condition of connectors.
(3)Position controller (1).
(4)Install washers (5), install and tighten controller attachment screws (4).
(5)Connect electrical connector (3).
(6)Connect BITE cable (2) to stowage connector on rack structure.
(7)Remove safety clips and tags and close circuit breakers 4HK, 3HK, 7HK and 6HK.

D. Test
Carry out automatic temperature control test (Ref. 21-61-00, P. Block 501).

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.



BM5 21 61 16 4 AAMO 21-16
DM5

APU and Pack Temperature Demand Controller
Figure 401

(2)Close access door 121BL.
(3)De-energize the aircraft electrical network and disconnect electrical ground power unit.
(4)Restore system and aircraft to normal operating condition.

PACK DISCHARGE TEMPERATURE CONTROL SENSOR 15 HH (14HH) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2 m (6 ft. 7 in.).
B.	Circuit Breaker Safety Clips.
C.	Blanking Plugs/Caps.
D.	O-Ring.
E.	Lockwire Dia. 0.5 mm (0.020 in.).
F.	Torque Wrench 0.5 m. daN (30 lbf. in.).
G.	Warning Notices
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

2. Procedure

R (Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	AIR BLEED & COMPT TEMP/PACK 1 AUTO CTL	3HH	313/F55
131VU	AIR BLEED & COMPT TEMP/PACK 2 AUTO CTL	4HH	313/F57

(2)Display warning notices prohibiting pressurization of pneumatic system.
(3)Position access platform.
(4)Open access door 136AR.

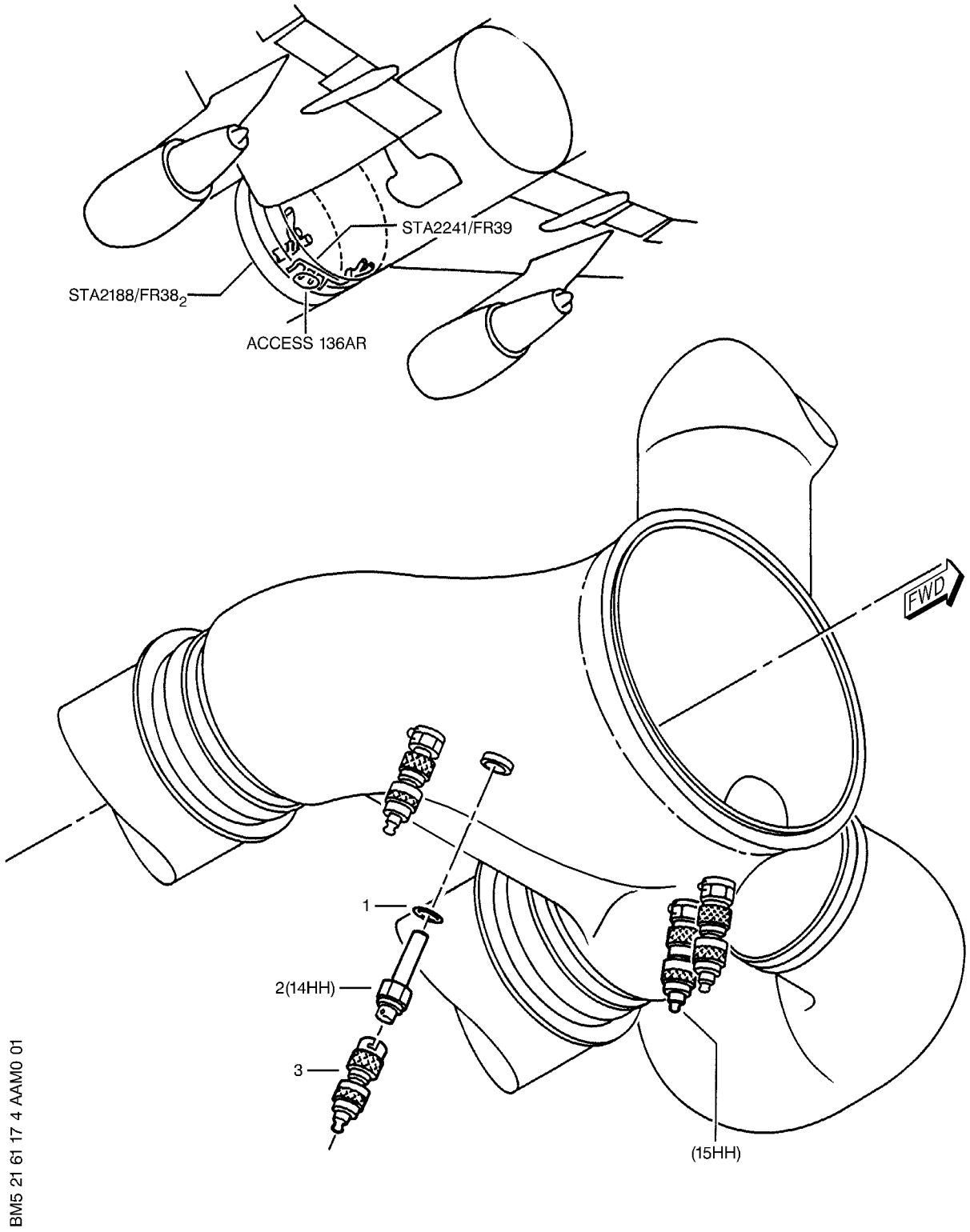
B. Removal

(1)Disconnect electrical connector (3).
(2)Cut and remove lockwire ; remove temperature control sensor (2).
(3)Remove and discard O-ring (1).
(4)Cap open duct end and electrical connector.

C. Installation

(1)Remove blanking plugs/caps and check for correct condition of sensor mounting base and electrical connector.
(2)Clean and inspect sensor interface and/or adjacent area.
(3)Install new O-ring (1) on sensor.
(4)Install sensor (2) on mounting base.
(5)Tighten sensor (2). TORQUE to between 0.25 and 0.34 m. daN (22 and 30 lbf. in.).
(6)Connect electrical connector (3).
(7)Remove safety clips and tags and close circuit breakers 3 HH and 4 HH.

D. Test



Pack Discharge Temperature Control Sensor
Figure 401

R

Initial conditions
- correct electrical power supply
- forward services ventilation system in operation
- overhead panel circuit breakers closed, particularly those associated with **COMPT TEMP, AIR BLEED, AIR BLEED & COMPT TEMP**
- on **COMPT TEMP** panel **437VU PACK VALVE** 1 and 2 pusbutton switches are pressed (in).
- avionics compartment access door **121Bl** or **132AZ** open.

NOTE : Test instructions are given on the face of **APU** and pack temperature demand controller **37HK**.

ACTION	RESULT
1. On pack 1 (pack 2) temperature controller **11 HH** - remove **BITE** connector guard - connect **BITE** cable from **APU** and pack temperature demand controller **37 HK**	On **APU** and pack temperature demand controller - **BITE READY/UNPLUG CABLE AFTER USE** indicator light comes on - **GO** indicator light comes on - **NO GO** indicator light remains off.
2. On **APU** and pack temperature demand controller **37 HK** - press **NO GO** indicator light - place **BITE** selector switch in position 10	- **NO GO** indicator light comes on. - **GO** indicator light comes on.

NOTE : Rotate **BITE** selector switch clockwise : at each position wait for **GO** indicator light to come on.

E. Close-Up
(1) On **APU** and pack temperature demand controller **37HK**
- place **BITE** selector switch in position 1.

(2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4) Restore system and aircraft to normal operating condition.
(5) Close access door **136AR**.
(6) Remove access platform.

PACK DISCHARGE TEMPERATURE SENSOR 23WV (22WV) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2 m (6 ft. 7 in.)
B.	Torque Wrench 0.5 m.daN (44 lbf. in.)
C.	Circuit Breaker Safety Clips
D.	Blanking Plugs/Caps
E.	O-Rings
F.	Lockwire
G.	Warning Notices
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

2. Procedure

R (Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
21VU	SDAC/SUPPLY	6WV	109/A05

(2)Display warning notices prohibiting pressurization of pneunatic system.
(3)Position access platform.
(4)Open access door 136AR.

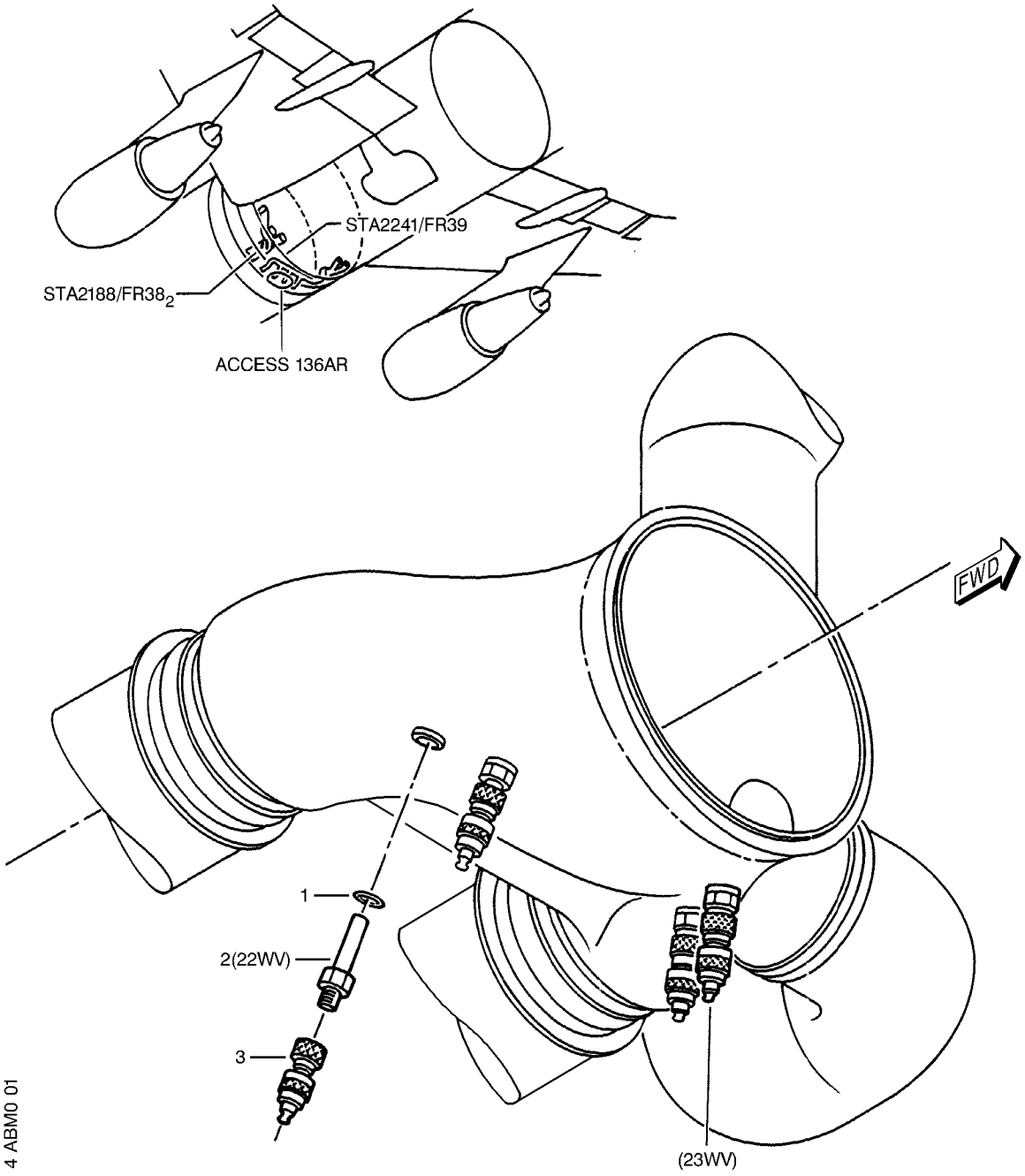
B. Removal

(1)Cut and remove lockwire and remove sensor (2).
(2)Disconnect electrical connector (3).
(3)Remove and discard O-ring (1).
(4)Cap open duct ends and electrical connector (3).

C. Installation

(1)Remove blanking plugs/caps and check for correct condition of electrical connector and sensor mounting base.
(2)Clean and inspect sensor interface and/or adjacent area.
(3)Install new O-ring (1) on sensor (2).
(4)Install sensor (2) on mounting base.
(5)Tighten sensor and TORQUE to between 0.25 m.daN and 0.34 m.daN (22 and 30 lbf.in.) and wirelock.
(6)Connect electrical connector (3).
(7)Remove safety clip and tag and close circuit breaker 6WV.

D. Test



Pack Discharge Temperature Sensor
Figure 401

R

(1)Initial conditions
- overhead panel circuit breakers closed, particularly those associated with **COMPT TEMP, AIR BLEED & COMPT TEMP, ECAM**
- correct electrical power supply
- forward services ventilation system in operation.

(2)On **ECAM** control panel
- Press **BLEED** pushbutton switch
  . pushbutton switch integral light comes on
  . on the right **ECAM** display unit, **AIR BLEED** page is displayed.
- Using **LEFT DISPLAY** and **RIGHT DISPLAY** knobs, adjust brightness on left and right **ECAM** display units.

(3)On **AIR BLEED** page
- check pack 1 (2) discharge temperature.

E. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3)Restore system and aircraft to normal operating condition.

(4)Close access door **136AR**.

(5)Remove access platform.

(6)Remove warning notices.

TURBINE INLET TEMPERATURE SENSOR 21WV (20WV) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs/Caps
B.	Warning Notices
C.	Circuit Breaker Safety Clips
D.	O-Rings
E.	Lockwire
Referenced Procedures	
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
- 24-41-00, P. Block 301	AC External Power Control

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open, safety and tag the following circuit breaker :

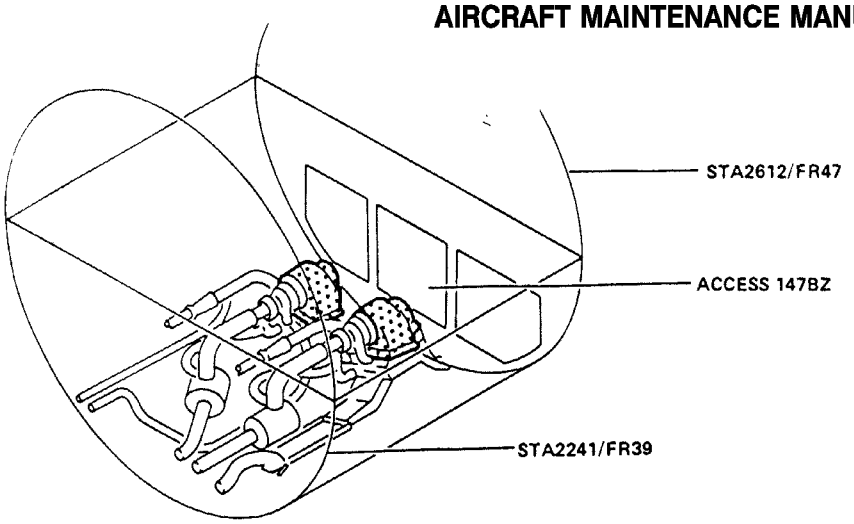
PANEL	SERVICE	IDENT.	LOCATION
21VU	SDAC/SUPPLY	6WV	109/A05

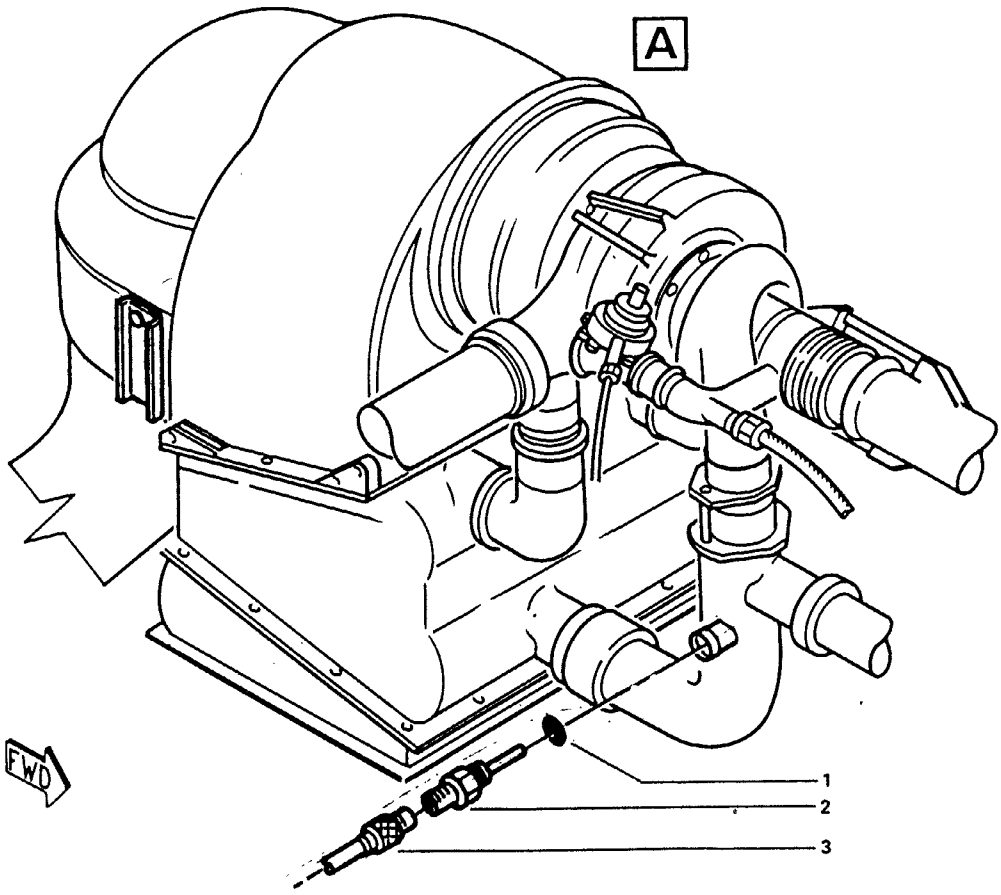
(2)Display warning notices prohibiting pressurization of pneumatic system.
(3)Open one main gear door (Ref. 32-12-11, P. Block 301).
(4)Open access door 147BZ.

B. Removal
(1)Disconnect electrical connector (3).
(2)Cut and remove lockwire, remove sensor (2).
(3)Remove and discard O-ring (1).
(4)Blank off sensor port on duct and cap electrical connector (3).

C. Installation
(1)Remove blanking plugs/caps and check for correct condition of electrical connector (3) and sensor (2) mounting base on duct.
(2)Clean and inspect sensor (2) interface and/or adjacent area.
(3)Install new O-ring (1) on sensor (2).
(4)Install sensor (2) on mounting base, tighten and wirelock.
(5)Connect electrical connector (3).
(6)Remove safety clip and tag and close circuit breaker 6WV.

D. Test
(1)Initial conditions
- panel circuit breakers closed, particularly those associated with COMPT TEMP, AIR BLEED & COMPT TEMP, ECAM.





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Turbine Inlet Temperature Sensor
Figure 401

- correct electrical power supply
- forward services ventilation system in operation.

(2)On **ECAM** control panel
- press **BLEED** pushbutton switch
  . pushbutton switch light comes on
  . on the right **ECAM** display unit, **AIR BLEED** page is displayed
- Using **LEFT DISPLAY** and **RIGHT DISPLAY** knob, adjust brightness on left and right **ECAM** display units.

(3)On **AIR BLEED** page
- check pack 1 (2) turbine inlet temperature.

E. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(3)Restore system and aircraft to normal operating condition.

R **CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY**
R **INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/**
R **PANELS AT FR47.**

(4)Close access door 147BZ.

(5)Close main gear door (Ref. 32-12-11, P. Block 301).

(6)Remove warning notices.

1. Ram Air Outlet Flap

WARNING : BEFORE PROCEEDING WITH ANY MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED. BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

NOTE : The procedure is the same for L and R outlet flaps.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.6 m (8 ft. 7 in.)
B.	Warning Notice
C.	Circuit Breaker Safety Clips
D.Material No. 19-010	Lockwire
Referenced Procedure - 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

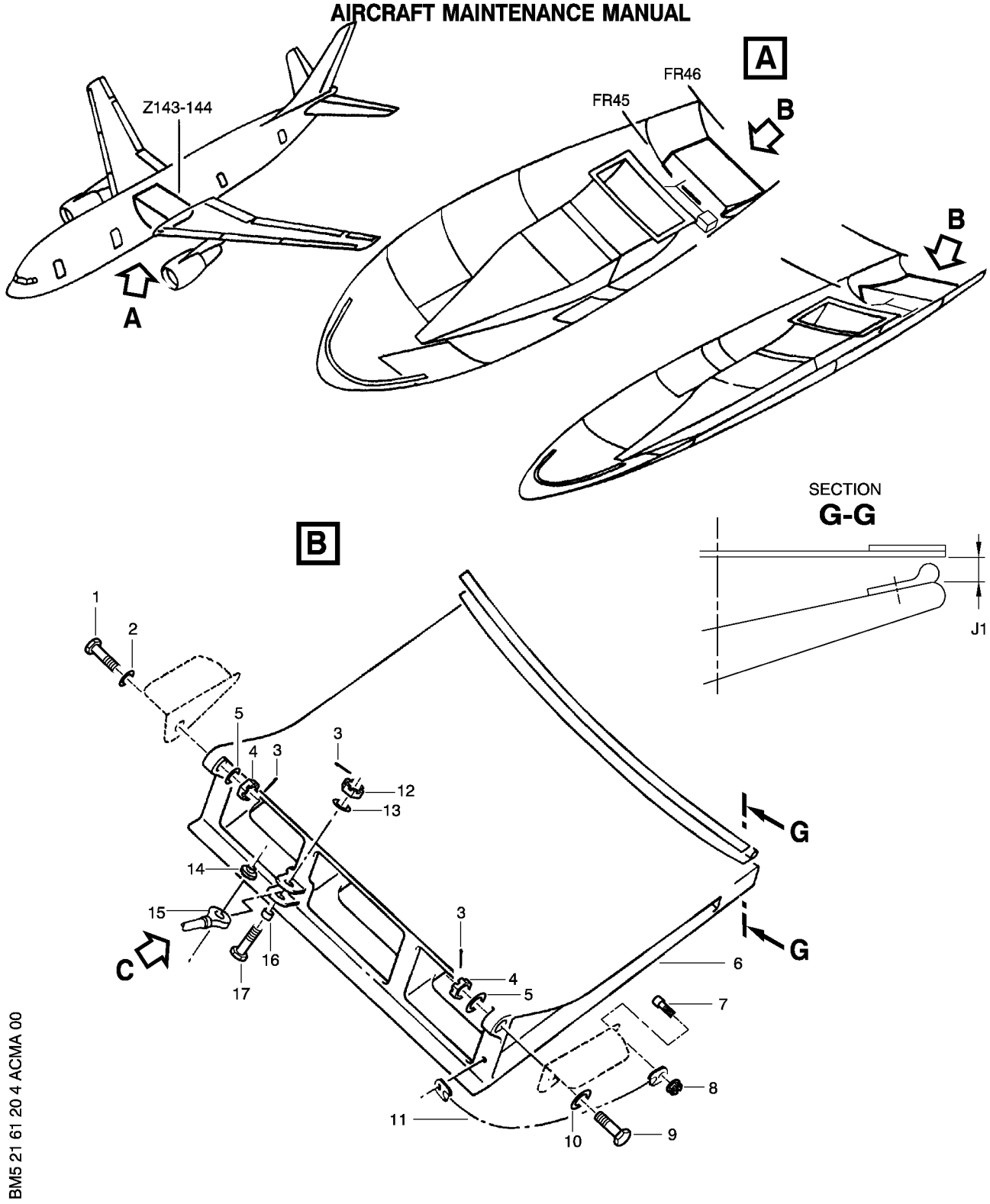
3. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP/PACK 1/MAN CTL	5HH	203/G20
22VU	COMPT TEMP/PACK 2/MAN CTL	6HH	203/G26
22VU	AIR BLEED/RAM AIR	2HZ	203/G16

(2)On COMPT TEMP panel 437VU :
(a)Release PACK VALVE 1 and 2 pushbutton switches - OFF legend comes on.
(b)Display a warning notice prohibiting any operation of the system.
(3)Open a main gear door (Ref. 32-12-11, P. Block 301).
(4)Position access platform.
(5)Open access door 143FL (144FR).

B. Removal of Ram Air Outlet Flap
NOTE : Hold ram air outlet flap on aircraft so that it will not fall.
(1)Remove cotter-pin (3), hexagonal nut (12), washer (13), shouldered bush (14), sliding-bush (16) and shoulder pin (17) to disconnect rod (15) from ram air outlet flap (6).
(2)Remove cotter-pin (3), hexagonal nut (4), flat washer (5), shoulder-pin (1) and locking washer (2).
(3)Remove cotter-pin (3), hexagonal nut (4), flat washer (5), shoulder-pin (9) and countersunk washer (10).



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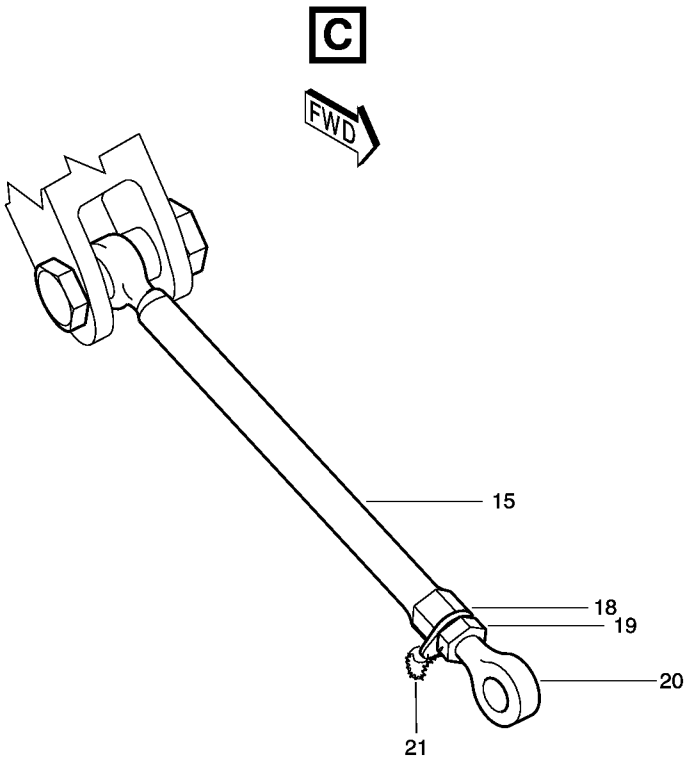
Ram Air Outlet Flap
(Sheet 1/2)
Figure 401



BM5 21 61 20 4 ACMJ 00

Ram Air Outlet Flap
(Sheet 2/2)
Figure 401

(4)Remove self-locking nut (8) and cylindrical head screw (7) to disconnect bonding lead (11) from aircraft.
(5)Remove ram air outlet flap (6).

C. Installation of Ram Air Outlet Flap

NOTE : Hold ram air outlet flap on aircraft so that it will not fall.

(1)Install shoulder-pin (1) and locking washer (2), flat washer (5) and hexagonal nut (4).
(2)Install shoulder-pin (9) and countersunk washer (10), flat washer (5) and hexagonal nut (4).
(3)Hold flap (6) in open position and install bonding lead (11) with cylindrical head screw (7) and self-locking nut (8). Tighten self-locking nut.
(4)Hold flap in closed position. Install shouldered bush (14), rod (15), sliding-bush (16) and shoulder-pin (17).
(5)Install washer (13) and hexagonal nut (12).
Tighten hexagonal nut.
(6)Tighten the two hexagonal nuts (4).
(7)Install the three cotter-pins (3).
(8)Make certain that clearance (J1) is between 6.1 and 7.6 mm (0.24 and 0.30 in.).
(9)If clearance is out of limits, adjust rod (15) as follows :
(Ref. Fig. 401)
(a)Cut lockwire (21).
(b)Untighten hexagonal nut (19).
(c)Adjust adjustable element (20) of rod (15).
(d)Tighten hexagonal nut (19).
(e)Check J1 :
- If J1 is correct :
. Install lockwire (Material 19-010) (21) between locking washer (18) and hexagonal nut (19).
- If J1 is not correct :
. Do the steps (9) (b), (c), (d) and (e) again until J1 is in the limits.

D. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 143FL (144FR).
(3)Close main gear door (Ref. 32-12-11, P. Block 301).
(4)Remove access platform.
(5)Close the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP/PACK 1/MAN CTL	5HH	203/G20
22VU	COMPT TEMP/PACK 2/MAN CTL	6HH	203/G26
22VU	AIR BLEED/RAM AIR	2HZ	203/G16

(6)On COMPT TEMP panel 437VU :
- Press PACK VALVE 1 and 2 pushbutton switches

. OFF legend goes off
. FAULT legend comes on.

(7)Remove warning notice.

TRIM AIR CONTROL AND OVERHEAT MONITORING - DESCRIPTION AND OPERATION

1. General

The system controls and monitors the pressure and temperature of the hot air used for conditioning the aircraft.

2. Component Location

(Ref. Fig. 001)
(Ref. Fig. 002)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
3HJ	P/BSW-AIR BLEED & COMPT TEMP/PTT	471VU	212		21-62-00
4HJ	P/BSW-AIR BLEED & COMPT TEMP/HOT AIR SUPPLY	437VU	212		21-62-00
5HJ	SWITCH-AIR BLEED AND COMPT TEMP TEST SEL	471VU	212		21-62-00
7HJ	THERMAL SWITCH-INLET DUCT, COCKPIT		131	131HW	21-62-14
8HJ	THERMAL SWITCH-INLET DUCT, FWD CABIN		132	132NW	21-62-14
9HJ	THERMAL SWITCH-INLET DUCT, MID CABIN		131	131QW	21-62-14
10HJ	THERMAL SWITCH-INLET DUCT, AFT CABIN		132	132QW	21-62-14
11HJ	VALVE-HOT AIR SUPPLY		136	136AR	21-62-11
12HJ	MFA-HOT AIR SUPPLY/HI PRESS	471VU	212		21-62-00
13HJ	PRESSURE SW-HOT AIR SUPPLY V		136	136AR	21-62-13
A017	CHECK VALVE-HOT AIR MANIFOLD, PACK 1		136	136AR	21-62-12
B017	CHECK VALVE-HOT AIR MANIFOLD, PACK 2		136	136AR	21-62-12

3. Description

A. Trim Air Control

R **ON A/C 001-100,

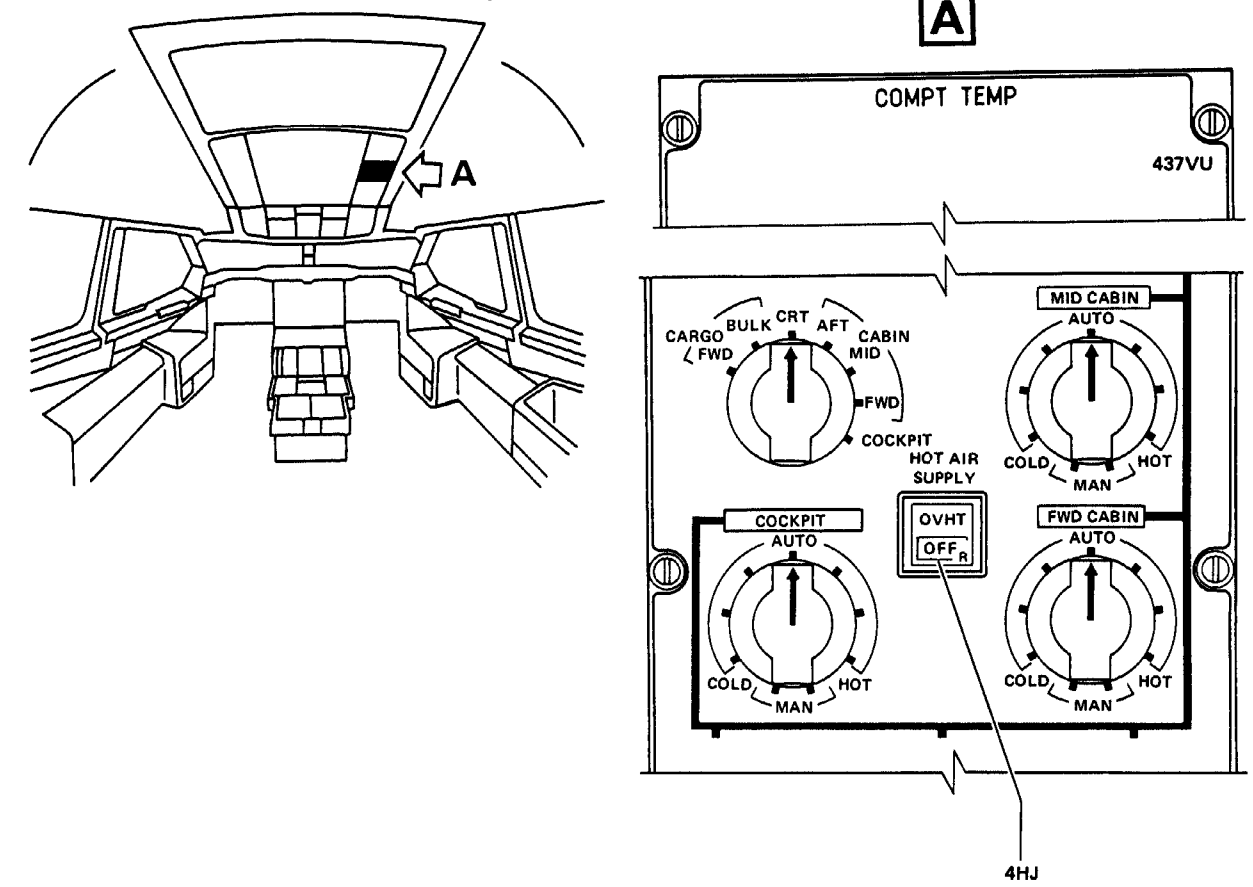
(Ref. Fig. 003)

R **ON A/C 101-200,

(Ref. Fig. 004)

R **ON A/C ALL

Hot air is bled downstream of pack 1 and 2 flow control valves. The air flows through two check valves to hot air supply valve 11HJ which regulates the pressure of hot air before it enters the hot air manifold. The pressure of the air in the hot air manifold is monitored by hot air



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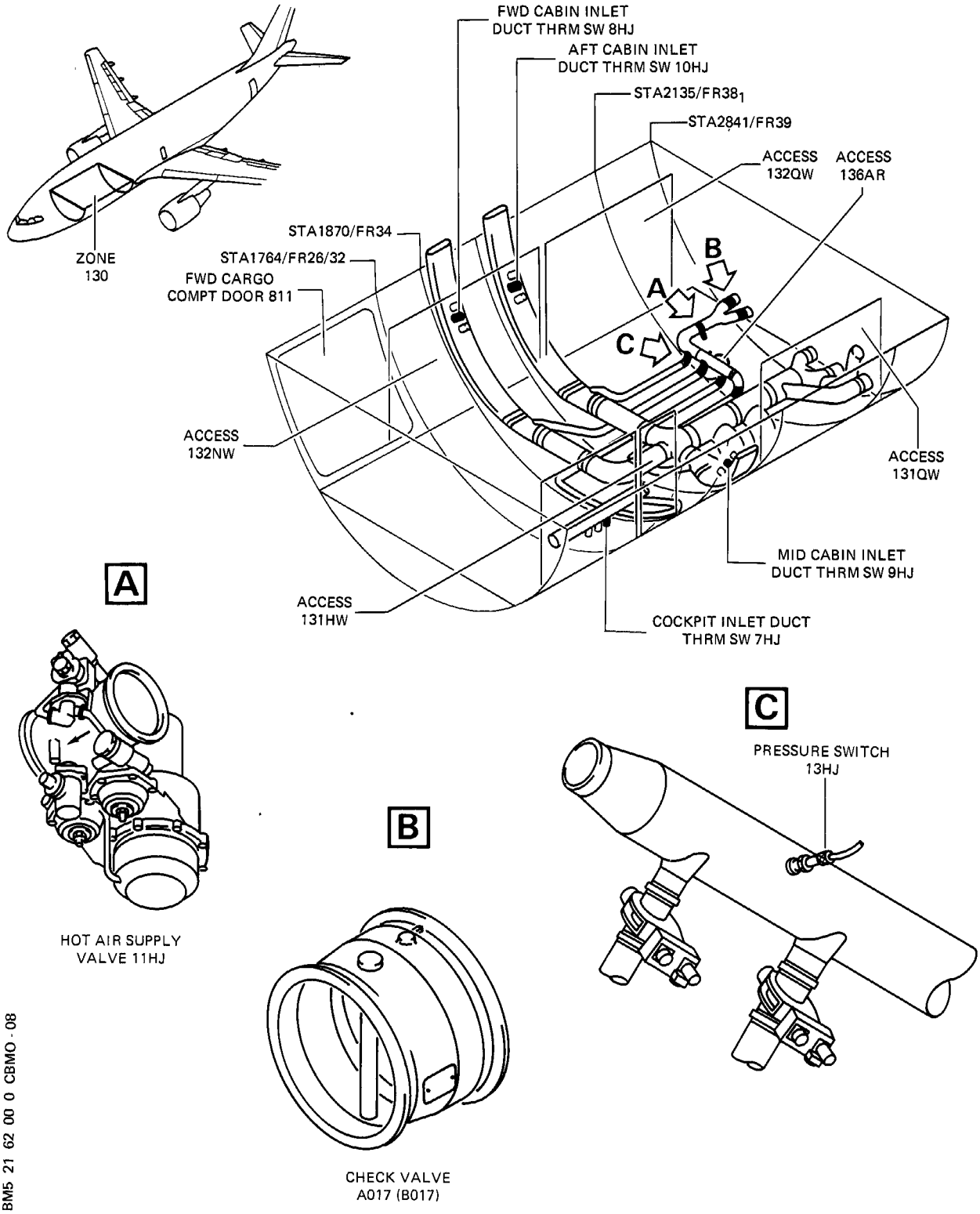
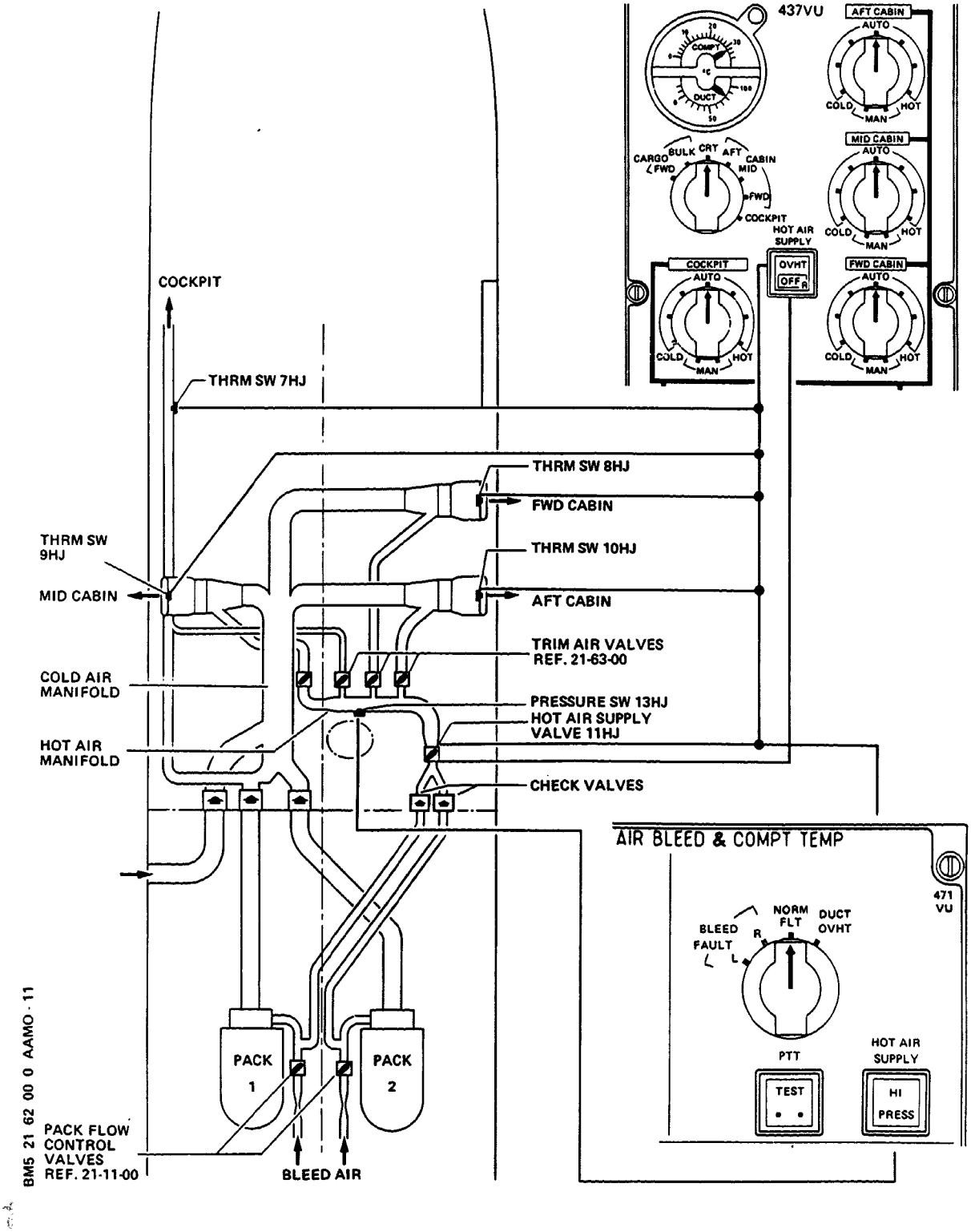
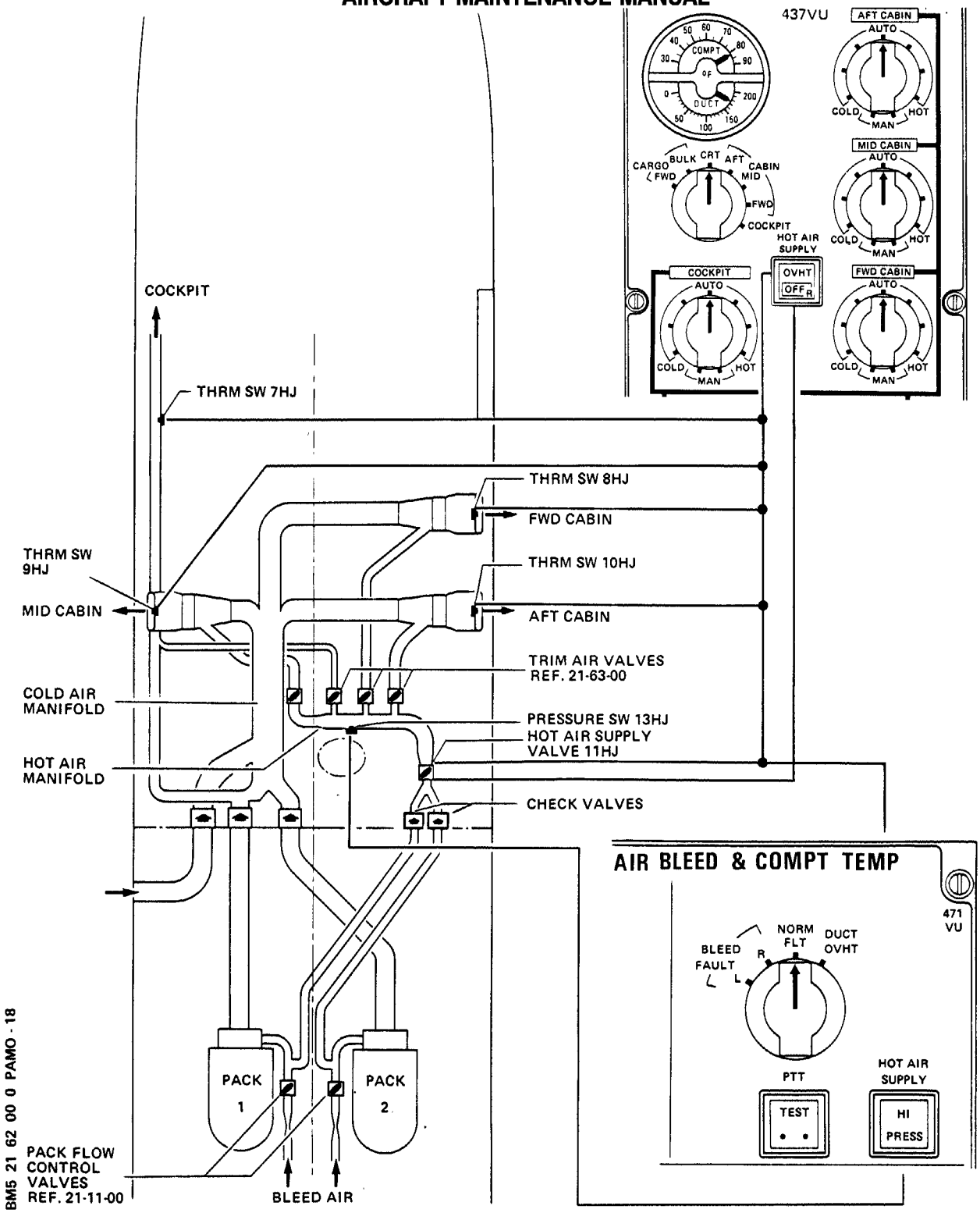
Trim Air Control-Control and Indicating
Figure 001



Trim Air Control-Component Location
Figure 002



Trim Air Control - Airflow Diagram
Figure 003



Trim Air Control - Airflow Diagram
Figure 004

manifold pressure switch 13HJ.
The air leaves the hot air manifold and is directed through the trim air valves (controlled by the flight compartment and cabin temperature control system (Ref. 21-63-00)) to the cold air supply ducts leading from the packs to provide conditioning air at the required temperature.
The temperature of the conditioned air is monitored by inlet duct thermal switches prior to distribution to the occupied compartments.

B. Controls and Indicating
(Ref. Fig. 005)
(Ref. Fig. 006)

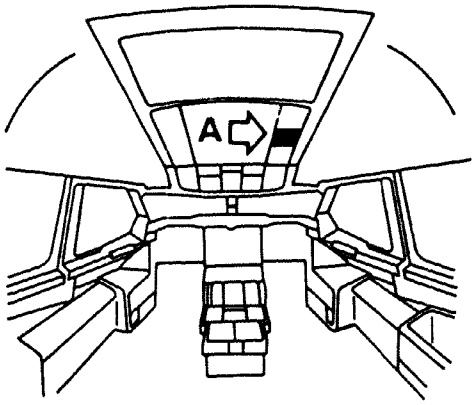
C. Central Warnings
(1)Illumination of the OVHT legend (hot air overheat) on the HOT AIR SUPPLY pushbutton switch is accompanied by :
- activation of the single chime aural warning
- illumination of the MASTER CAUTION warning lights on CAPT and F/O main instrument panels 3VU and 5VU
- display of a message on the left ECAM display unit (Ref. 31-51-00).

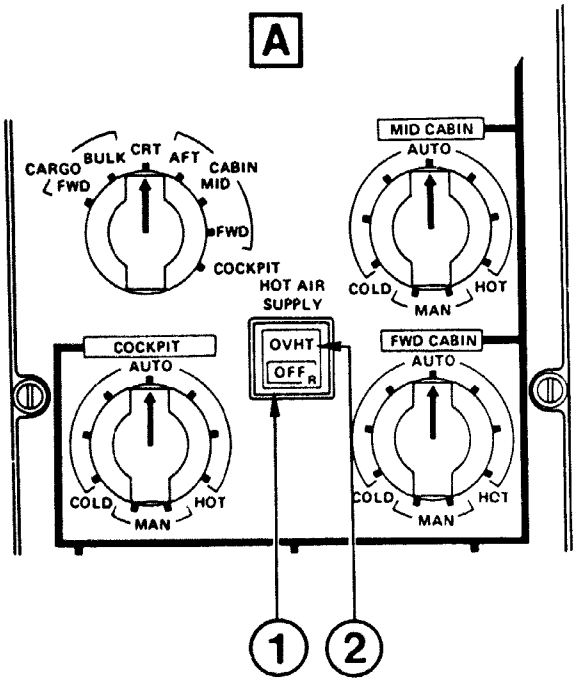
(2)Indications and parameters relative to normal or abnormal operating conditions are displayed on the AIR COND page synoptic diagram on the right ECAM display unit :
- indication of hot air supply valve position
- symbol identifying the four zones (flight compartment and three cabin zones) with associated temperature indications (this information is provided by the flight compartment and cabin temperature control system (Ref. 21-63-00)).

NOTE : In the event of overheat warning (OVHT), the temperature indication displayed on the AIR COND page enables immediate identification of the zone affected.

4. Component Description

A. Hot Air Supply Valve 11HJ
(Ref. Fig. 007)
(Ref. Fig. 008)
This valve maintains or cuts off the pressure of the hot air used for conditioning at a differential pressure of 4 ±1 psi with respect to the cabin.
The valve is of the butterfly type, pneumatically operated and electrically controlled by a solenoid. In the absence of air pressure, the valve butterfly is spring-loaded closed.
The valve can be manually locked in closed position. It is provided with two test connectors and a visual position indicator.
When the solenoid is energized, the supply pressure, regulated with respect to cabin pressure and downstream pressure by the regulator servovalve, acts on the upper part of the actuator to open the valve. Downstream pressure and the spring force acting on the lower part of the actuator causes displacement of the butterfly. In the event of excessive supply pressure, the relief valve opens and supply pressure is vented to cabin pressure. In the event of excessive downstream pressure, the downstream





1. HOT AIR SUPPLY PUSHBUTTON SWITCH 4HJ SERVES TO CONTROL HOT AIR SUPPLY VALVE 11HJ.
   - PUSHBUTTON SWITCH PRESSED (IN) :
     - THE HOT AIR SUPPLY VALVE IS CONTROLLED PNEUMATICALLY TO REGULATE HOT AIR PRESSURE
     - THE HOT AIR SUPPLY VALVE IS AUTOMATICALLY AND ELECTRICALLY CONTROLLED TO THE CLOSED POSITION IN CASE OF OVERHEAT.
   - PUSHBUTTON SWITCH RELEASED (OUT) (WHITE OFF/R LEGEND ON) :
     - THE HOT AIR SUPPLY VALVE CLOSES
     - THE OVERHEAT CIRCUIT IS RESET.
2. AMBER OVHT LEGEND
   - LEGEND COMES ON IN CASE OF OVERHEAT AT THE INLET DUCT OF THE FLIGHT COMPARTMENT OR ONE OF THE THREE CABIN ZONES.

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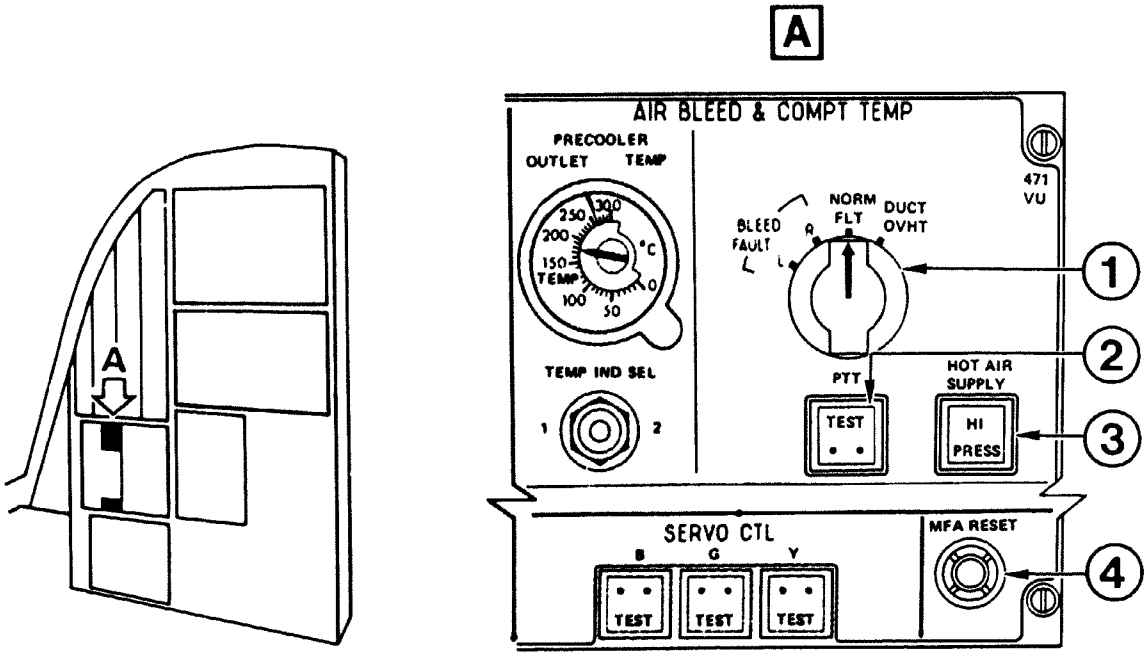
Overhead COMPT TEMP Panel 437VU
Figure 005



- 1 - AIR BLEED & COMPT TEMP TEST SELECTOR SWITCH 5HJ SERVES TO SELECT THE WARNING CIRCUITS (BLEED FAULT OR DUCT OVHT) TO BE TESTED.
- 2 - PTT PUSHBUTTON SWITCH 3HJ
  -WHITE TEST LEGEND IS ON WHEN TEST SELECTOR SWITCH IS NOT IN NORM FLT POSITION.
  -PUSHBUTTON SWITCH PRESSED (IN) : TEST OF THE SELECTED WARNING CIRCUIT.
- 3 - HOT AIR SUPPLY/HI PRESS MEMORIZED FAULT ANNUNCIATOR (MFA) 12HJ :
  -MFA COMES ON WHITE TO INDICATE OVERPRESSURE IN THE HOT AIR MANIFOLD AND REMAINS ON TO MEMORIZE THE FAULT.
- 4 - MFA RESET PUSHBUTTON SWITCH
  -SERVES TO UNLATCH MFA AFTER FAULT HAS DISAPPEARED.

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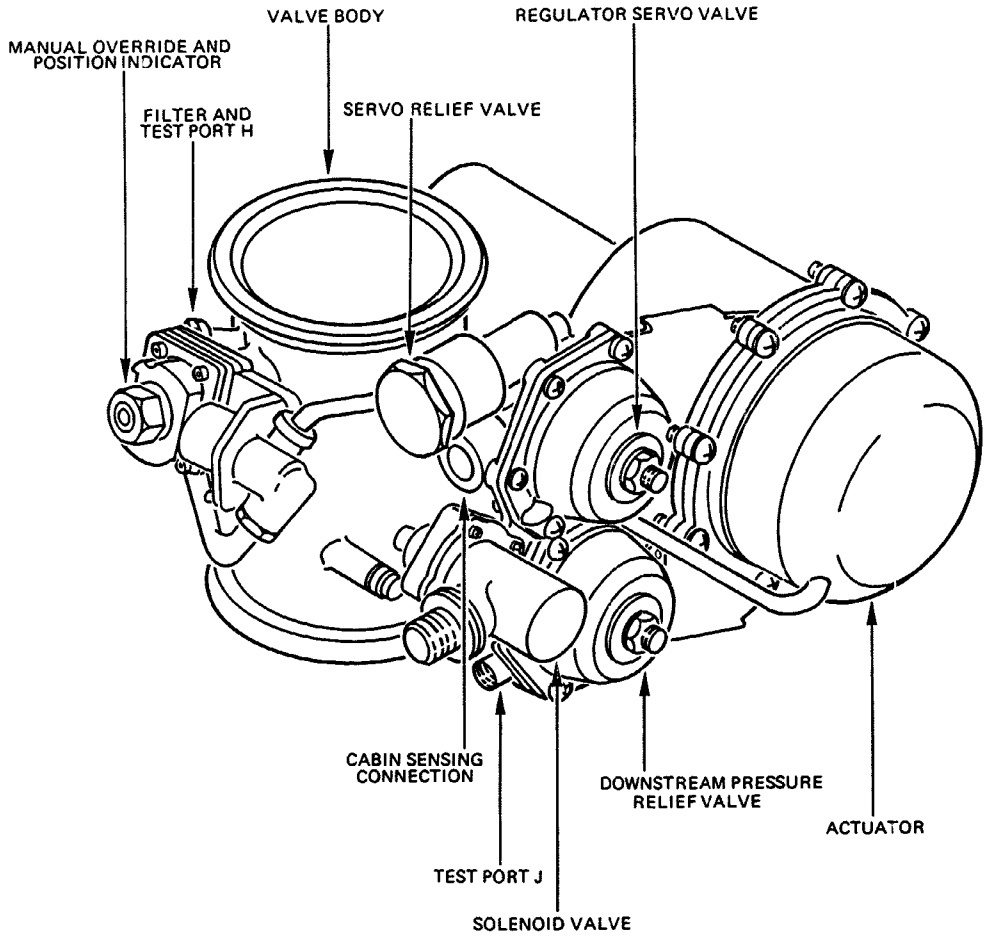
Maintenance Panel 471VU
Figure 006



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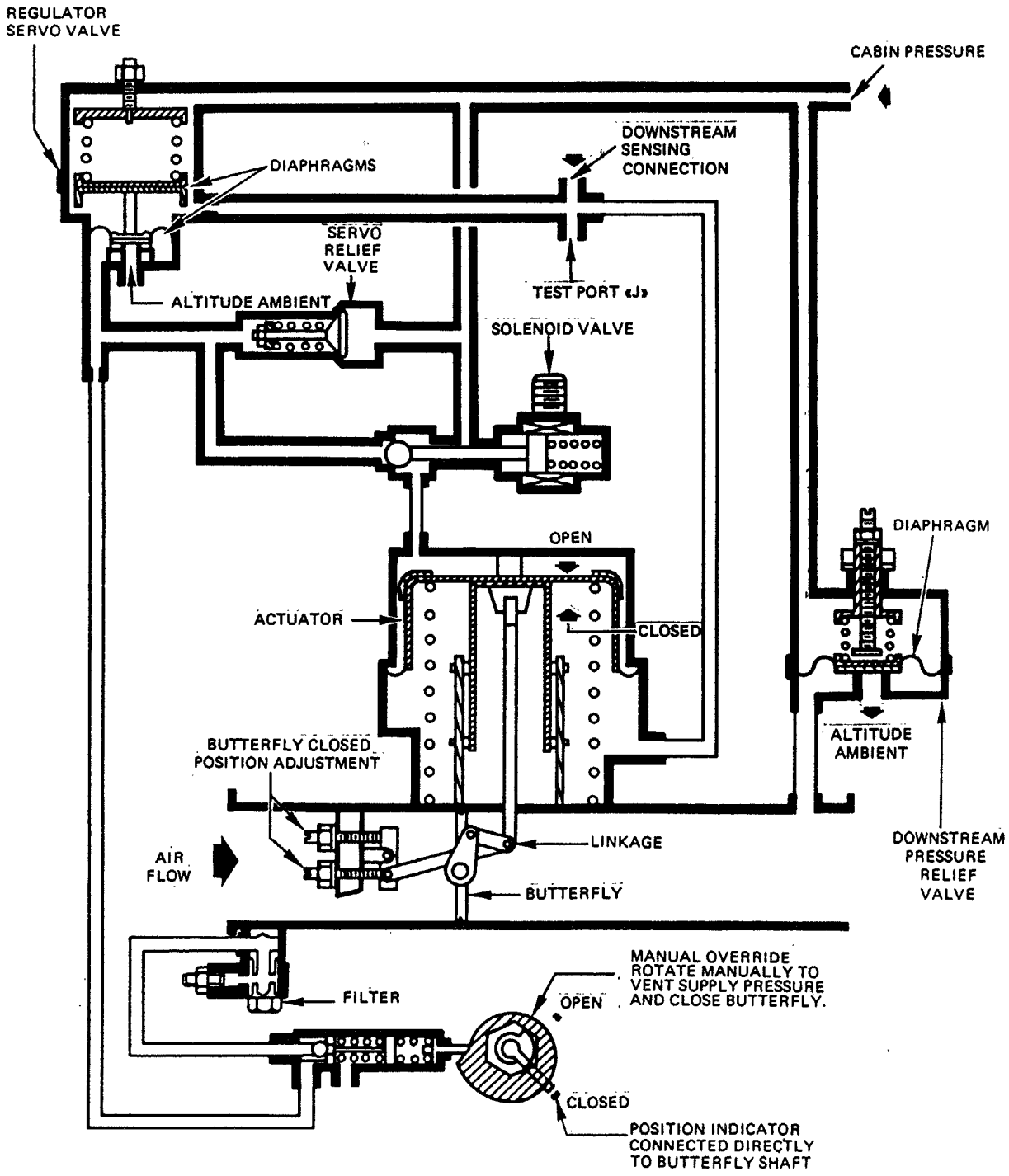
Hot Air Supply Valve 11HJ
Figure 007



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Hot Air Supply Valve - Schematic
Figure 008

pressure relief valve opens and downstream pressure is vented to cabin pressure.

B. Hot Air Manifold Check Valve
(Ref. Fig. 009)
Two check valves are installed in the hot air manifold supply system upstream of the hot air supply valve.
Each valve consists of two semi-circular flaps mounted on a common pin.
The flaps enable hot air inflow but prevent hot air backflow.

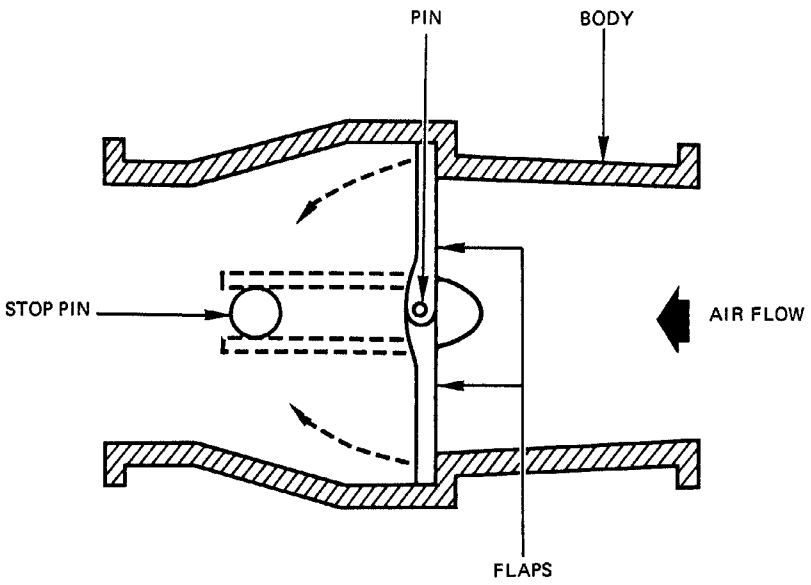
C. Hot Air Manifold Pressure Switch 13HJ
The pressure switch detects overpressure in the hot air manifold and delivers an electrical signal function of the pressure detected.
The pressure force is applied to a diaphragm and transmitted to a flexible disc. When pressure reaches 0.86 ±0.034 bars (12.5 ±0.5 psi), the flexible disc is deflected, thus energizing the electrical assembly.
When pressure decreases from 0.069 to 0.41 bars (1 to 6 psi), the flexible disc and the electrical assembly return to their initial configuration.

D. Inlet Duct Thermal Switches 7HJ, 8HJ, 9HJ and 10HJ.
The thermal switch consists of a bimetallic strip enclosed in a steel plunger and is equipped with a hermetically sealed electrical connector.
If overheat - 88° ±4.5°C (190 ±8°F) - is detected in the inlet duct of the flight compartment or one of the three cabin zones, the thermal switch associated with the zone affected by overheat causes :
- closure of hot air supply valve 11HJ
- activation of warnings in the flight compartment.

5. Operation
(Ref. Fig. 010)

A. Pressure Control
With the refrigeration unit pack(s) operating (pack 1 (2) flow control valve open) and HOT AIR SUPPLY pushbutton switch 4HJ pressed (in), hot air supply valve 11HJ opens and regulates the pressure of the hot air used for conditioning.

B. Overheat
In the event of overheat in the inlet duct of the flight compartment or one of the three cabin zones (FWD, MID, AFT), associated thermal switch 7HJ (8HJ, 9HJ, 10HJ) causes :
- closure of hot air supply valve 11HJ (spring-loaded closed) (power supply to valve solenoid is cut off)
- illumination of the amber OVHT legend on HOT AIR SUPPLY pushbutton switch 4HJ
- activation of the central warnings with : message display on the left ECAM display unit ; symbol, identification and temperature of the zone affected by overheat displayed amber on the AIR COND page on the right ECAM display unit.
When overheat condition is no longer present, the hot air supply valve can be reopened by releasing (OFF/R configuration) then pressing HOT AIR



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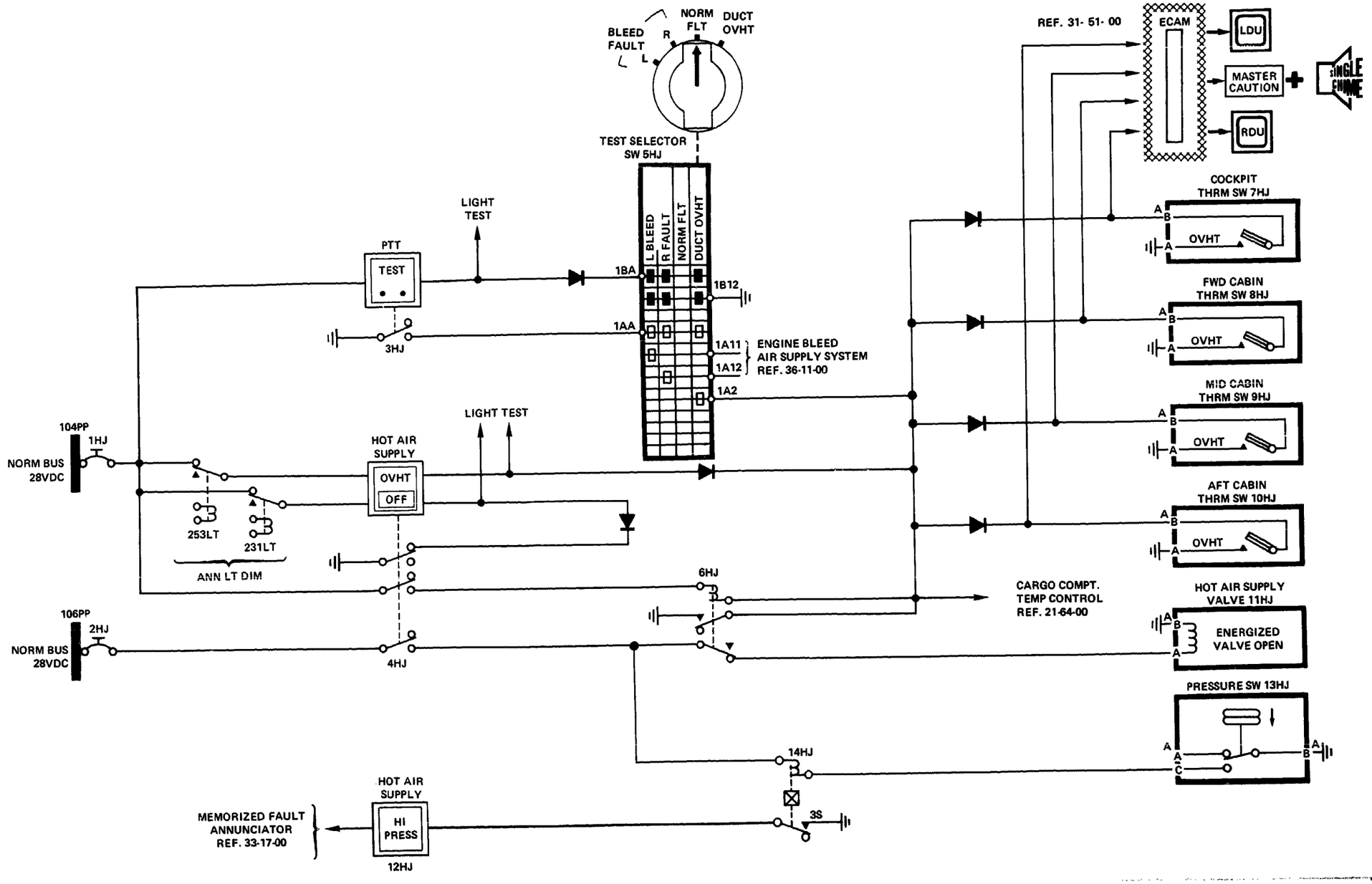
Hot Air Manifold Check Valve
Figure 009



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Trim Air Control and Overheat Monitoring - Schematic
Figure 010

SUPPLY pushbutton switch 4HJ ; the trim air valve of the zone affected by overheat must first be closed by placing the zone temperature selector in the MAN/COLD position (Ref. 21-63-00)
Identification of the zone affected by overheat is provided by reading the AIR COND page on the right ECAM display unit or the temperature displayed on the DUCT section of the COMPT/DUCT dual temperature indicator. COMPT/DUCT temperature selector switch serves to select temperature display (all zones) on the right ECAM display unit when placed in CRT position or to select the zone for which temperature is to be indicated.

C. Overpressure
If overpressure occurs in the hot air manifold, pressure switch 13HJ causes HOT AIR SUPPLY/HI PRESS memorized fault annunciator (MFA) 12HJ to come on.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Operational Test

A. Reason for the Job
- To check for correct operation of overheat warning.
R - To read lateral panel MFA "HOT AIR SUPPLY - HI PRESS".

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure

(1)Job set-up
(a)Circuit breakers closed, particularly those associated with COMPT TEMP & AIR BLEED (HOT AIR SUPPLY).
(b)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Make certain that electronics racks ventilation is correct.
(d)On AIR BLEED & COMPT TEMP section of panel 471VU
- check that HOT AIR SUPPLY/HI PRESS memorized fault annunciator is off (Normal operation)
- check that AIR BLEED & COMPT TEMP test selector switch is in NORM FLT position.
(e)On COMPT TEMP panel 437VU
- check that HOT AIR SUPPLY pushbutton switch is pressed (in) (OFF/R and OVHT legends are off).

(2)Overheat warning test

ACTION	RESULT
1. On AIR BLEED & COMPT TEMP section of panel 471VU - place AIR BLEED & COMPT TEMP test selector switch in DUCT OVHT position.	On PTT pushbutton switch - TEST legend comes on.
- press then release PTT pushbutton switch.	On panel 437VU - OVHT legend of HOT AIR SUPPLY pushbutton switch comes on.
2. On COMPT TEMP panel 437VU - release HOT AIR SUPPLY pushbutton switch	On panel 437VU - OVHT legend of HOT AIR SUPPLY pushbutton switch goes off - OFF/R legend of HOT AIR SUPPLY pushbutton switch comes on.

ACTION	RESULT
- press **HOT AIR SUPPLY** pushbutton switch	On panel **437VU** - **OFF/R** legend of **HOT AIR SUPPLY** pushbutton switch goes off.
3. On **AIR BLEED & COMPT TEMP** section of panel**471VU** - place **AIR BLEED & COMPT TEMP** test test selector switch in **NORM FLT** position	On **PTT** pushbutton switch - **TEST** legend goes off.

R (c)Read the lateral panel **HOT AIR SUPPLY/HI PRESS MFA**

ACTION	RESULT
On maintenance panel **472VU** - Place **ANN LT** switch in **TEST** position.	- **MFAs** come on.
- Place **ANN LT** switch in **READ** position.	- **MFAs** remain on.
On maintenance panel **472VU** - Press **MFA RESET** pushbutton switch.	- All **MFAs** go off.

R **NOTE** : **HOT AIR SUPPLY/HI PRESS MFA** may come on again, indicating the status of the system.

(3)Close-up
(a)Restore system and aircraft to normal operating condition.
(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

HOT AIR SUPPLY VALVE 11HJ - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2 m (6 ft. 7 in.)
B.	Torque Wrench 0.5 mdaN (44 lbf. in.)
C.	Circuit Breaker Safety Clips
D.	O-Rings
E.	Warning Notices
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

2. Procedure

R (Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP/HOT AIR SUPPLY/WARN	1HJ	311/H57
131VU	COMPT TEMP/HOT AIR SUPPLY/CTL	2HJ	312/G57

(2)Display notices prohibiting pressurization of pneumatic system.
(3)Position access platform.
(4)Open access door 136AR.

B. Removal

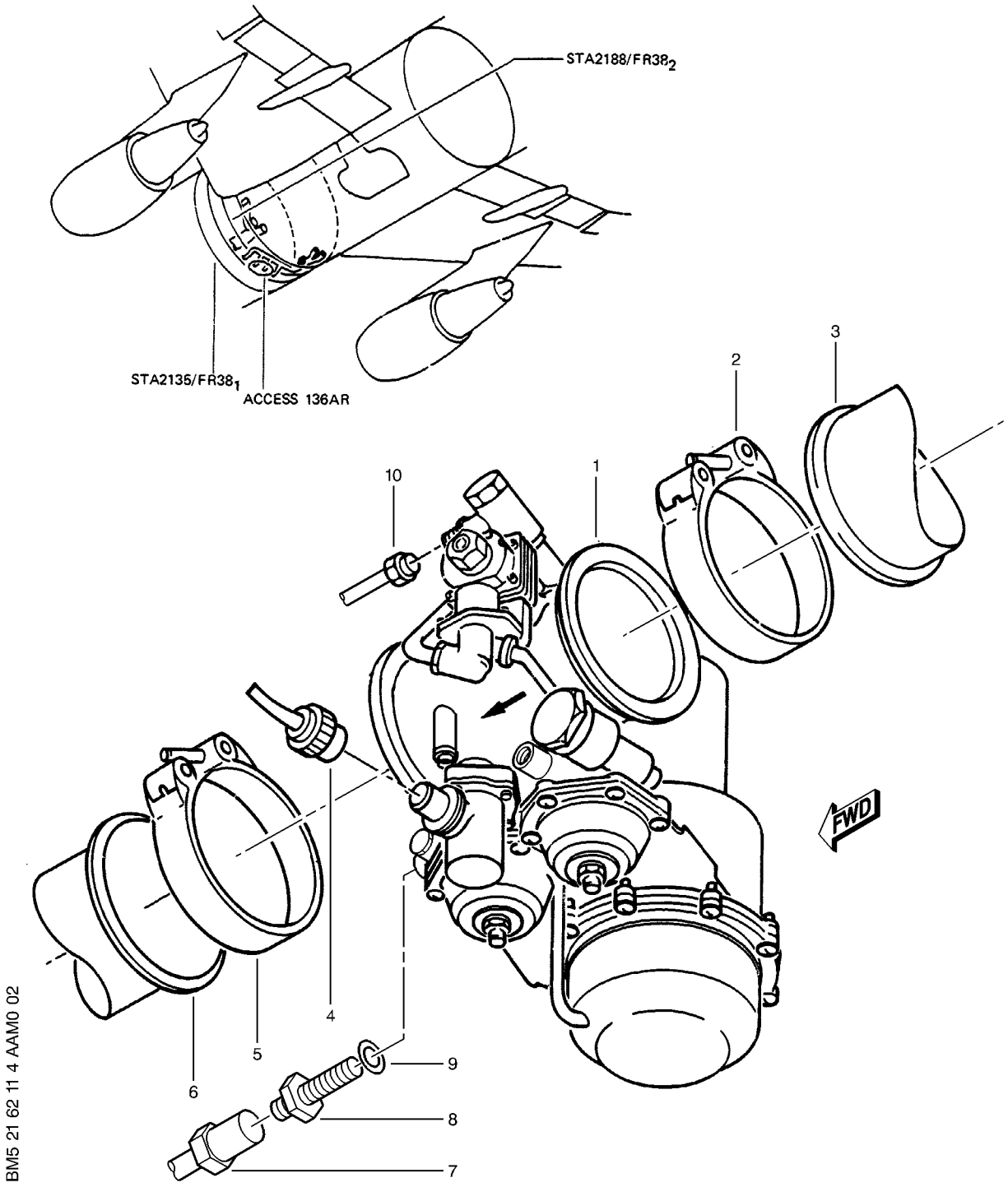
(1)Disconnect electrical connector (4).
(2)Disconnect sense lines (7) and (10).
(3)Hold hot air supply valve (1) and loosen nuts of clamps (2) and (5).
(4)Remove clamps (2) and (5).
(5)Remove hot air supply valve (1).
(6)Cap open ends of ducts (3) and (6), sense lines (7) and (10) and electrical connector (4).

C. Preparation of Replacement Component

(1)Clean and inspect union (8) retained from removed hot air supply valve and install on replacement component. Replace O-ring (9).
(2)Check that hot air supply valve butterfly position corresponds to that indicated on visual position indicator (hot air supply valve should be closed and position indicator in CLOSED position).
(3)Check safetying of valve manual override.

D. Installation

(1)Remove blanking plugs/caps from ducts (3) and (6), sense lines (7) and



Hot Air Supply Valve
Figure 401

R

(10) and electrical connector (4) and check for correct condition of duct (3) and (6) flanges, sense line (7) and (10) end fittings and electrical connector (4).
(2) Clean and inspect hot air supply valve interface and/or adjacent area.
(3) Install hot air supply valve (1) between ducts (3) and (6), with arrow indicating airflow direction pointing forwards.
(4) Install clamps (2) and (5) ; TORQUE nuts to the value given on clamps.
(5) Connect sense lines (7) and (10).
(6) Connect electrical connector (4).
(7) Remove safety clips and tags and close circuit breakers 1HJ and 2HJ.

E. Test
(1) Initial conditions
- correct electrical power supply
- forward services ventilation system in operation
- panel circuit breakers closed particularly those associated with COMPT TEMP, AIR BLEED, AIR BLEED & COMPT TEMP.

ACTION	RESULT
On COMPT TEMP panel 437VU - release then press HOT AIR SUPPLY pushbutton switch	Valve solenoid operation is audible.

F. Close-Up
(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3) Restore system and aircraft to normal operating condition.
(4) Close access door 136AR.
(5) Remove access platform.
(6) Remove warning notices.

HOT AIR SUPPLY VALVE 11HJ - DEACTIVATION/REACTIVATION

Ref. : MEL Sect. 1.21, item 13
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.

WARNING : BEFORE PROCEEDING WITH ANY MAINTENANCE WORK ON AIR CONDITIONNING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Deactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.6 m (8 ft. 7 in.)
(2)	Warning Notice
(3)	Blanking Plugs/Caps
(4)	Lockwire

B. Procedure

R (Ref. Fig. 901)

(1)Job Set-up

(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP/HOT AIR SUPPLY/WARN	1HJ	311/H57
131VU	COMPT TEMP/HOT AIR SUPPLY/CTL	2HJ	311/G57

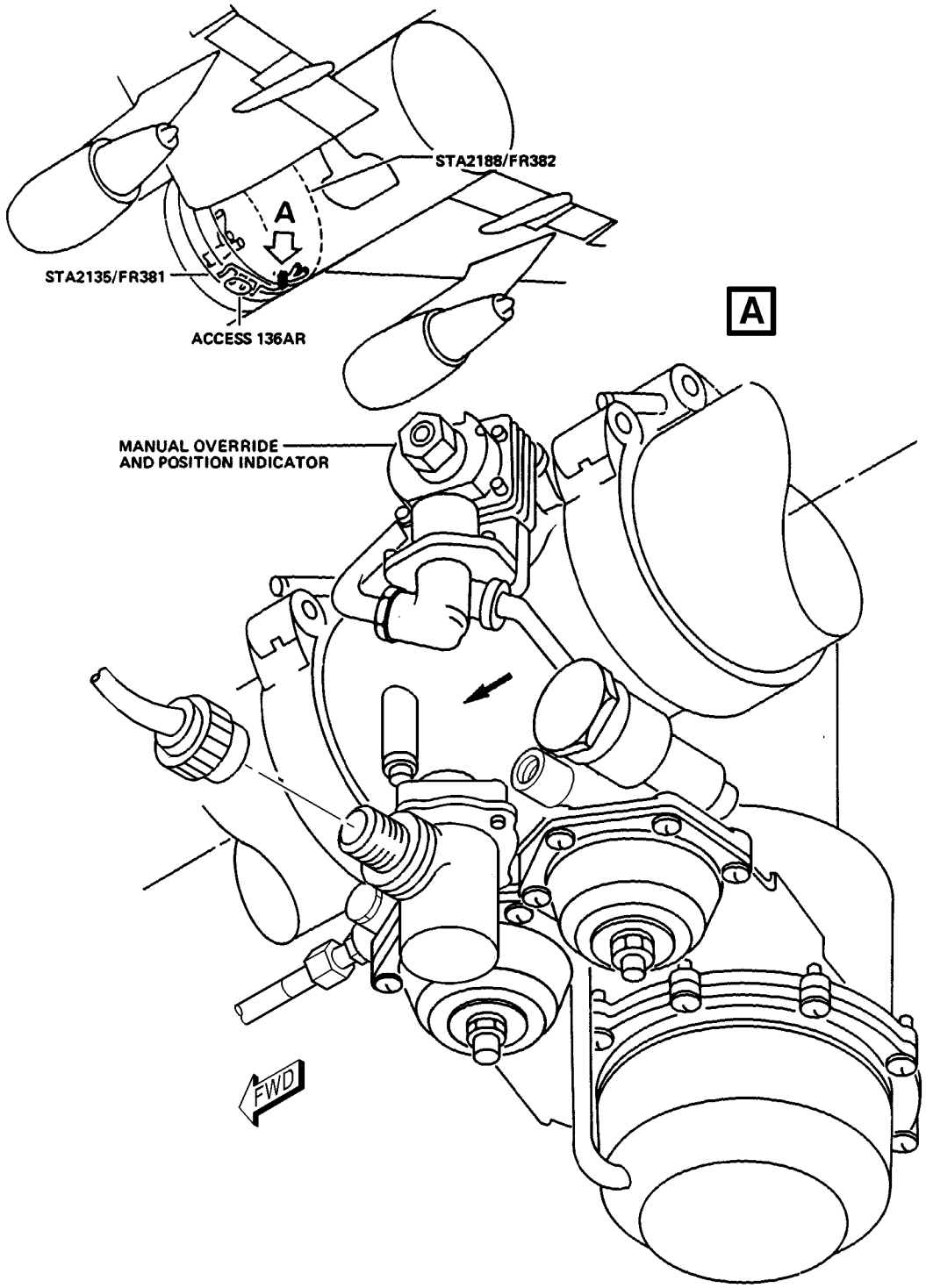
(b)In flight compartment, display warning notices prohibiting any operation of air conditioning systems.
(c)Position access platform.
(d)Open access door 136AR.

(2)Removal

(a)Disconnect electrical connector 11HJ-A.
(b)Cap electrical connector.
(c)Stow electrical cable and secure with tape.
(d)Move hot air supply valve 11HJ to fully CLOSED position by means of manual override.
(e)Wirelock manual override.

(3)Close-up

(a)Close access door 136AR.
(b)Remove access platform.
(c)Remove warning notices.
NOTE : The circuit breakers are to be left open, safetied and tagged.
(d)Install a temporary placard in the flight compartment to warn the flight crew that hot air supply valve 11HJ is deactivated.
(e)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(f)Make an entry in the aircraft technical log.



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R

Hot Air Supply Valve
Figure 901

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.6 m (8 ft. 7 in.)

B. Procedure (Ref. Fig. 901)

(1)Job Set-Up

(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP/HOT AIR SUPPLY/WARN	1HJ	311/H57
131VU	COMPT TEMP/HOT AIR SUPPLY/CTL	2HJ	311/G57

(b)In flight compartment, display warning notices prohibiting any operation of air conditioning systems.

(c)Position access platform.

(d)Open access door 136AR.

(2)Installation

(a)Cut and remove lockwire and return manual override to normal operation position.

(b)Remove blanking plug/cap from electrical connector.

(c)Connect electrical connector 11HJ-A.

(d)Remove safety clips and tags and close circuit breakers 1HJ and 2HJ.

(e)Troubleshoot the system (Ref. TSM 21-62-00).

(3)Close-up

(a)Close access door 136AR.

(b)Remove access platform.

(c)Remove warning notices and temporary placard.

(d)Clear technical log.

(e)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

HOT AIR MANIFOLD CHECK VALVE - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Torque Wrench 0.6 m. daN (53 lbf. in.)
B.	Access Platform 2 m (6 ft. 7 in.)
C.	Warning Notices
D.	O-Rings
E.	Blanking Plugs/Caps
Referenced Procedure	
- 12-33-21, P. Block 001	Ground Air Pre-Conditioning

2. Procedure

(Ref. Fig. 401)

R NOTE : This procedure is the same for the two hot air manifold valves.

A. Job Set-Up

(1)Display warning notices prohibiting pressurization of pneumatic system.
(2)Position access platform.
(3)Remove access door 136AR.

B. Removal

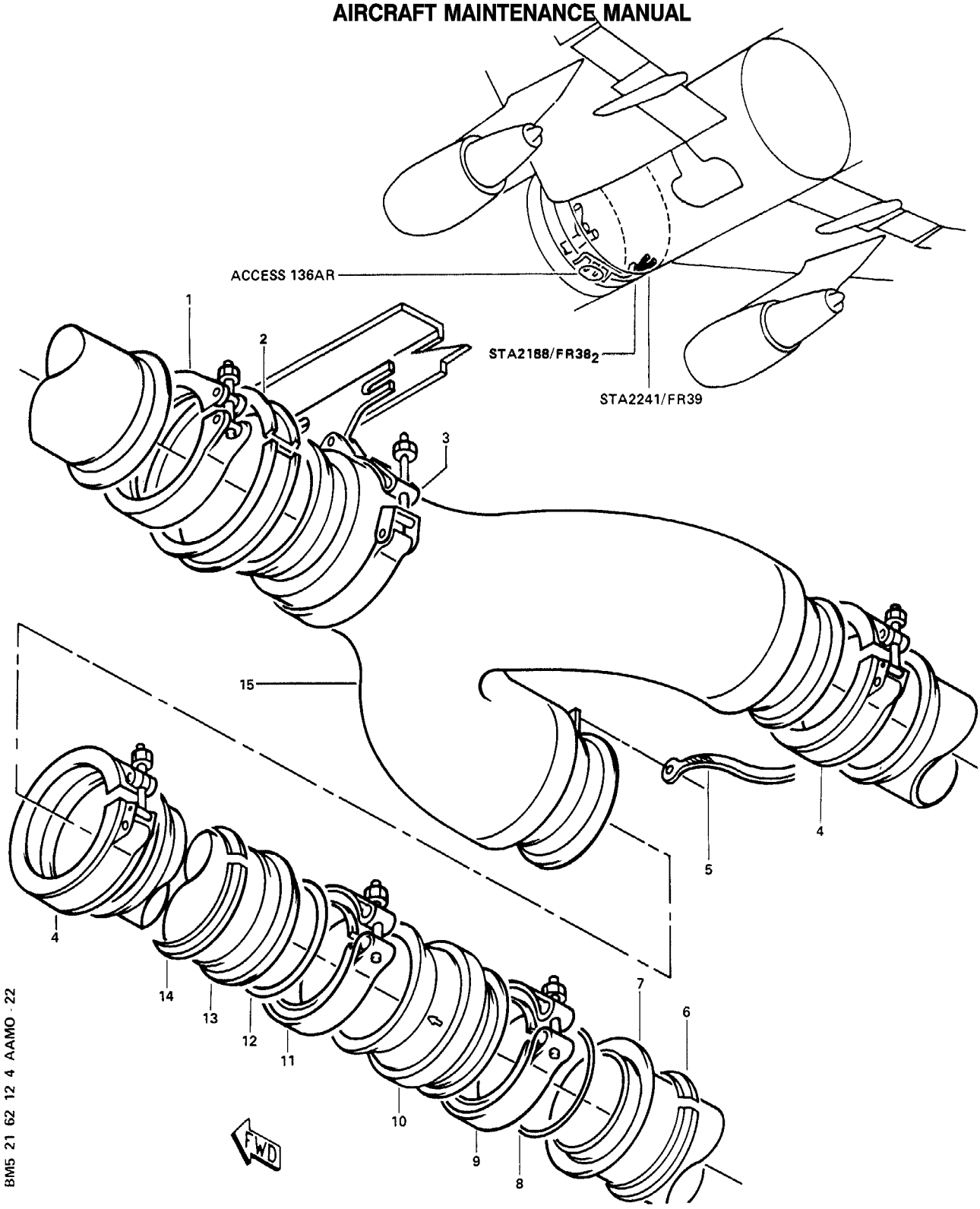
(1)Remove bonding strip (5).
(2)Open clamp (3) and remove half-rings (2).
(3)Remove the two clamps (4) and clamp (1).
(4)Remove duct (15).
(5)Remove clamp (11), half-rings (14) and coupling duct (13).
(6)Remove and discard O-ring (12).
(7)Remove clamp (9), half-rings (6) and check valve (10).
(8)Remove and discard O-ring (8).
(9)Cap open duct ends.

C. Installation

(1)Remove blanking plugs/caps and check for correct condition of duct and bulkhead fitting (7) flanges.
(2)Clean and inspect check valve interface and/or adjacent area.
(3)Install a new O-ring (8) in bulkhead fitting groove.
(4)Install check valve (10) on bulkhead fitting (7) with arrow indicating airflow direction pointing forward and TOP marking located at the upper part. Make certain that O-ring (8) remains in position in groove.

NOTE : A locating stud on the check valve allows angular positioning in bulkhead fitting (7) notch.

NOTE : Make certain that the check valve is correctly installed :
- Install check valve flap pin vertical.
- Manually operate flaps.
- Check that they move freely with no hard point and seat



Hot Air Manifold Check Valve
Figure 401

correctly.
(5)Install half-rings (6) and clamp (9), tighten nut ; TORQUE to value given on clamp.
(6)Install a new O-ring (12) in groove in coupling duct (13) flange.
(7)Install coupling duct (13) on check valve (10).
(8)Install half-rings (14) and clamp (11), tighten nut ; TORQUE to value given on clamp.
(9)Install duct (15).
(10)Install half-rings (2) and clamp (3) ; do not tighten clamp at this stage.
(11)Install the two clamps (4) and clamp (1) ; tighten nuts ; TORQUE to value given on clamps.
(12)Tighten clamp (3).
(13)Connect bonding strip (5).

D. Test
(1)Perform a pre-conditioning using the refrigeration unit pack (by HP ground air supply unit(s) or by the APU (Ref. 12-33-21, P. Block 501)).
(2)Perform a visual check of the valve connection flanges for air leakage.
NOTE : Leaks are not permitted.
(3)After approx. 15 minutes stop the pre-conditioning (Ref. 12-33-21, P. Block 501).

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 136AR.
(3)Remove access platform.
(4)Remove warning notices.

R 1. Inspection/Check

R A. Reason for the Job
R To check hot air manifold check valve for wear and freedom of flappers.

R B. Equipment and Materials

ITEM	DESIGNATION
A. Material No. 11-003	Cleaning Agents (Ref. 20-31-00)
Referenced Procedure - 21-62-12, P. Block 401	Hot Air Manifold Check Valve

R C. Procedure
R (1)Set-Up
R (a)Remove check valve (Ref. 21-62-12, P. Block 401).
R (b)Clean check valve with cleaning agent (Material No. 11-003).

R (2)Check
R (a)Check for correct condition of check valve, especially the two semi-circular flaps and associated seats and hinge pin (check for cracks, dents or corrosion).
R (b)Install check valve flap pin vertical. Manually operate flaps. Check that they move freely with no hard point and seat correctly.

R (3)Close-Up
R (a)Install check valve (Ref. 21-62-12, P. Block 401).

HOT AIR MANIFOLD PRESSURE SWITCH 13HJ - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2 m 6 ft. 7 in.
B.	Torque Wrench 0.5 m. daN (44 lbf. in.)
C.	Blanking Plugs/Caps
D.	Circuit Breaker Safety Clips
E.	O-Rings
F.	Lockwire
G.	Warning Notices

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

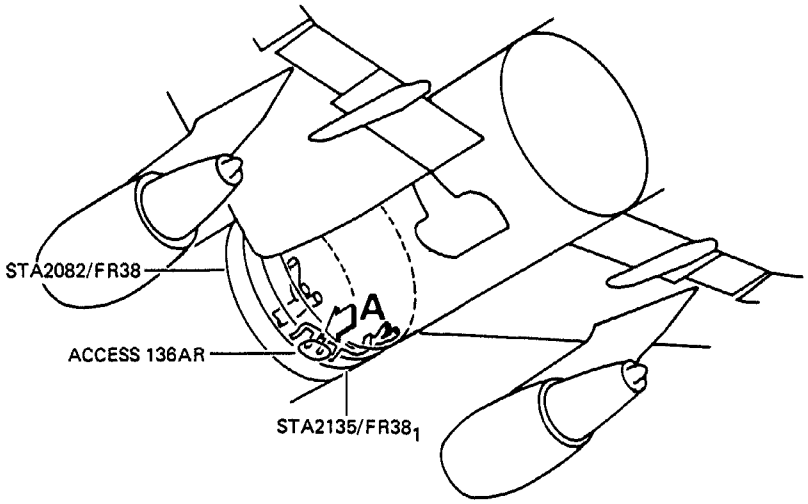
PANEL	SERVICE	IDENT.	LOCATION
131VU	AIR BLEED/HOT AIR SUPPLY/CTL	2HJ	312/G57

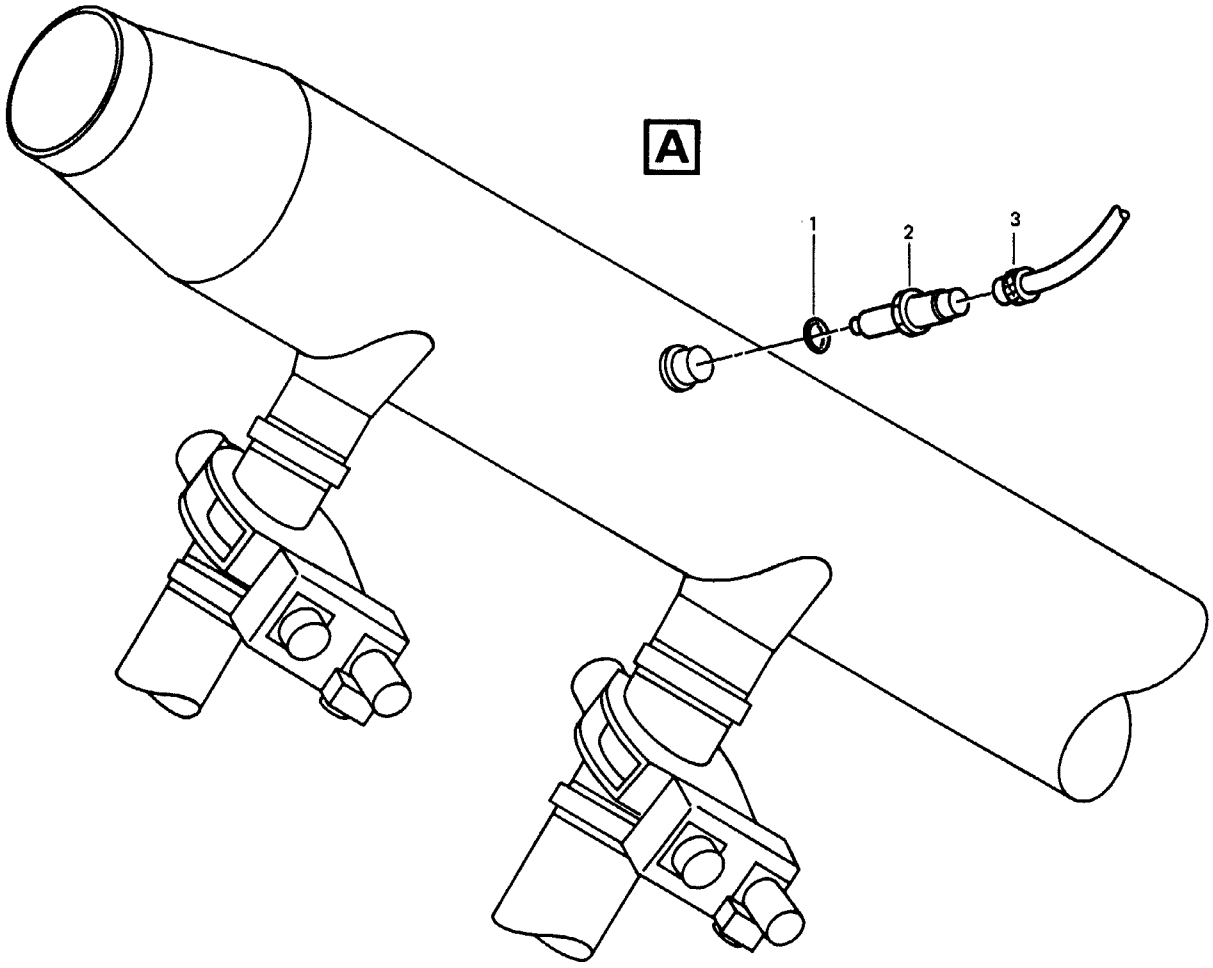
(2)Display warning notices prohibiting pressurization of pneumatic system.
(3)Position access platform.
(4)Open access door 136AR.

B. Removal
(1)Disconnect electrical connector (3).
(2)Cut and remove lockwire.
(3)Remove pressure switch (2).
(4)Remove and discard O-ring (1).
(5)Blank off electrical connector (3) and pressure switch orifice (2) on duct.

C. Installation
(1)Remove blanking plugs/caps from electrical connector and from duct orifice. Check for correct condition of electrical connector and duct orifice.
(2)Clean and inspect pressure switch interface and/or adjacent area.
(3)Install new O-ring (1) on pressure switch (2).
(4)Install pressure switch (2) in orifice and TORQUE to between 0.25 and 0.34 m. daN (22 and 30 lbf. in.).
(5)Wirelock.
(6)Connect electrical connector (3).

D. Close-Up





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Hot Air Manifold Pressure Switch
Figure 401

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove safety clip and tag and close circuit breaker 2HJ.
(3)Close access door 136AR.
(4)Remove access platform.

INLET DUCT THERMAL SWITCH 7HJ (8HJ, 9HJ, 10HJ) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.70 m (8 ft. 6 in.)
B.	Circuit Breaker Safety Clips
C.	Blanking Plugs/Caps
D.	O-Rings
E.	Torque Wrench 0.55 m.daN (49 lbf.in.)
F.	Lockwire
G.	Warning Notices

R Referenced Procedure

R	- 21-62-00, P. Block 501	Trim Air Control and Overheat Monitoring

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP/HOT AIR SUPPLY/WARN	1HJ	311/H57
131VU	COMPT TEMP/HOT AIR SUPPLY/CTL	2HJ	311/G57

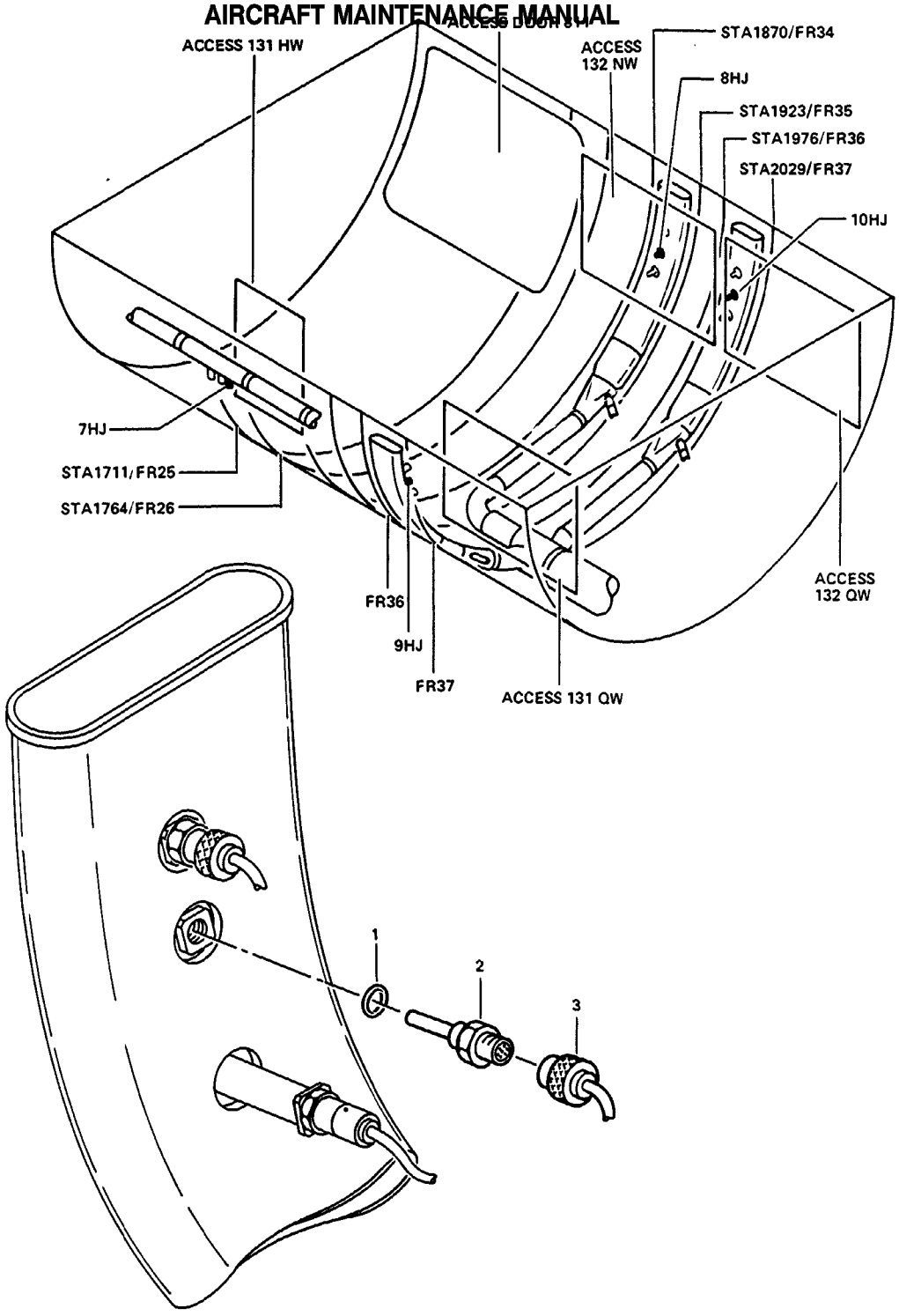
(2)Display warning notices prohibiting pressurization of pneumatic system.
(3)Position access platform at forward cargo compartment access door 811.
(4)Open access door 811.
(5)Remove the following access doors :
  (a)For thermal switch 7HJ : 131HW
  (b)For thermal switch 8HJ : 132NW
  (c)For thermal switch 9HJ : 131QW
  (d)For thermal switch 10HJ : 132QW.

B. Removal

(1)Disconnect electrical connector (3).
(2)Cut and remove lockwire, remove thermal switch (2).
(3)Remove and discard O-ring (1).
(4)Blank off thermal switch port on duct and cap electrical connector (3).

C. Installation

(1)Remove blanking plugs/caps. Check for correct condition of thermal switch port on duct and electrical connector (3).
(2)Clean and inspect thermal switch interface and/or adjacent area.
(3)Install new O-ring (1) on thermal switch (2).



BM5 21 62 14 4 AAMO 11

Inlet Duct Thermal Switch
Figure 401

(4)Install thermal switch (2) in port on duct and TORQUE to between 0.30 and 0.55 m.daN (26.5 and 49 lbf.in.).
(5)Wirelock.
(6)Connect electrical connector (3).

R D. Operational Test
R (1)Do operational test of overheat warning system
R (Ref. AMM 21-62-00, P. Block 501).

R E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Install the following access doors :
(a)For thermal switch 7HJ : 131HW
(b)For thermal switch 8HJ : 132NW
(c)For thermal switch 9HJ : 131QW
(d)For thermal switch 10HJ : 132QW.
(3)Remove safety clips and tags and close circuit breakers 1HJ and 2HJ.
(4)Close access door 811.
(5)Remove access platform.
(6)Remove warning notices.

FLIGHT COMPARTMENT AND CABIN TEMPERATURE CONTROL - DESCRIPTION AND OPERATION

1. General

The system ensures automatic or manual temperature control of the four occupied zones :
- flight compartment **(COCKPIT)**
- forward cabin **(FWD CABIN)**
- mid cabin **(MID CABIN)**
- aft cabin **(AFT CABIN).**

The automatic temperature control is the normal mode of control ; the manual temperature control mode is the standby mode.
The desired temperature of conditioning air is obtained by mixing air from two sources :
- a source of cold air supplied by the refrigeration unit packs
- a source of hot air bled upstream of the packs.

Each zone is controlled by an independent temperature control system with both automatic and manual modes. In automatic mode, the temperature can be controlled at any temperature selection setting between 18°C and 29°C (65°F and 80°F).

2. Component Location

**ON A/C 001-100,

(Ref. Fig. 001)

**ON A/C 101-200,

(Ref. Fig. 002)

**ON A/C ALL

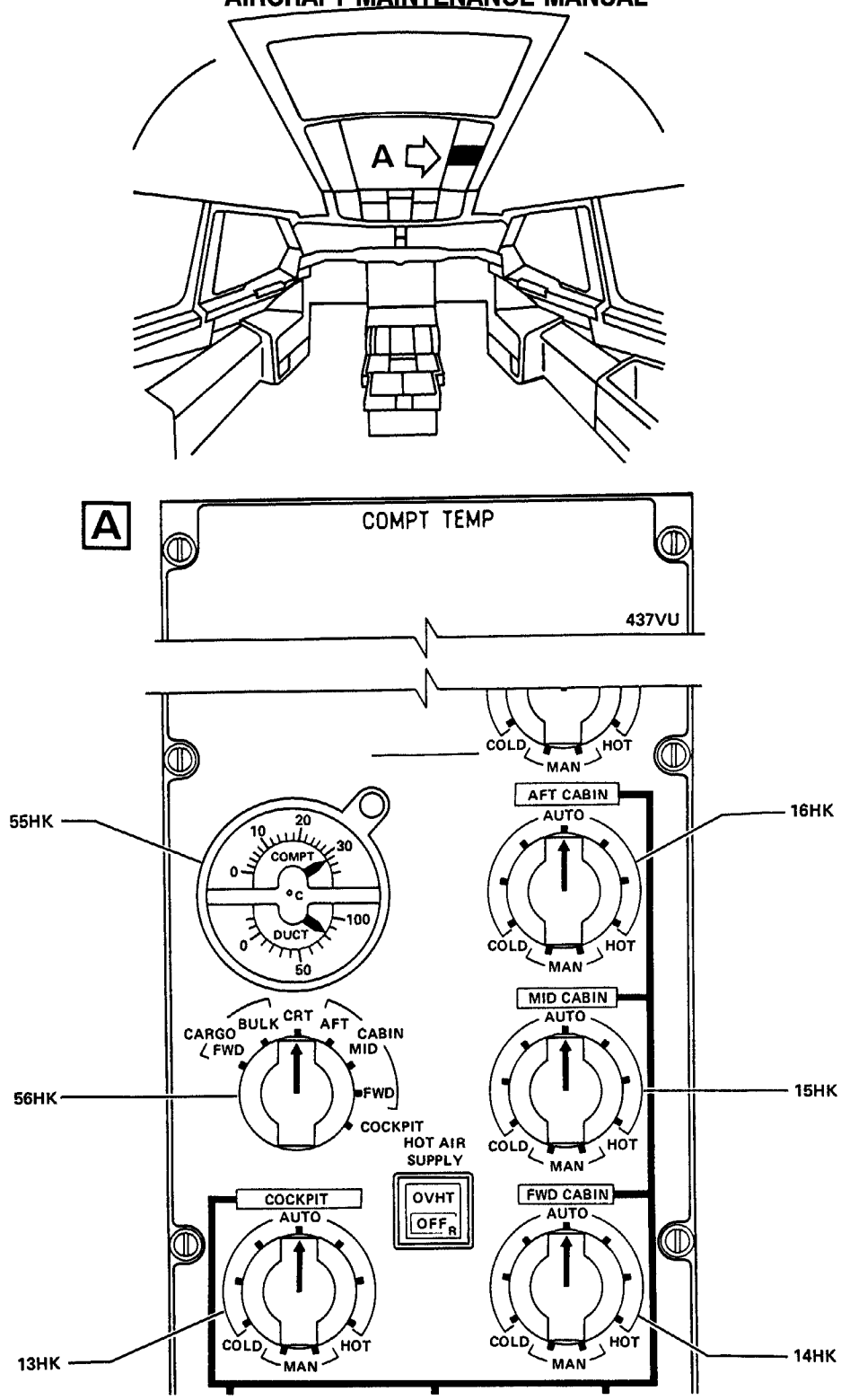
(Ref. Fig. 003)

(Ref. Fig. 004)

(Ref. Fig. 005)

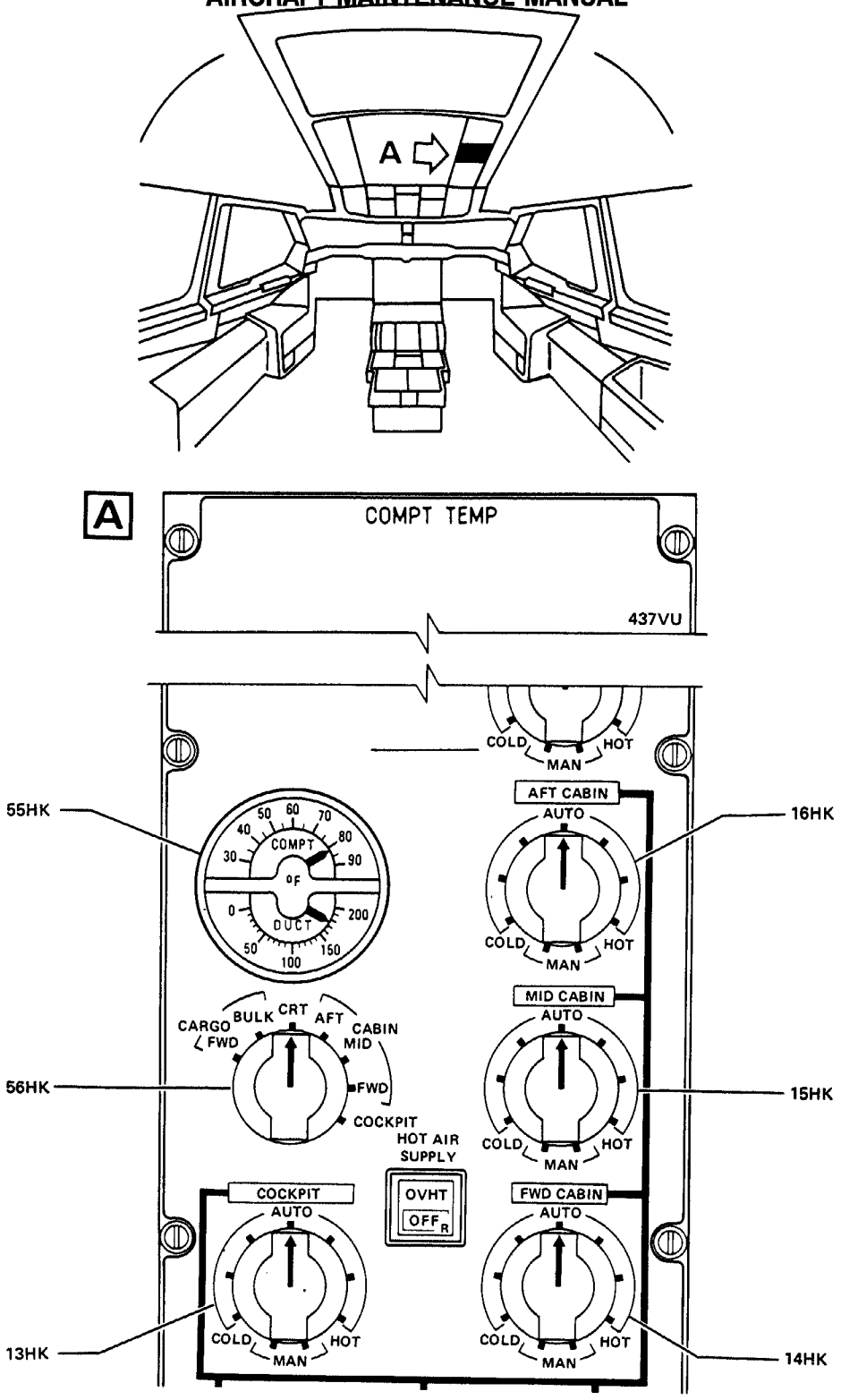
FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
13HK	SELECTOR-TEMP, COCKPIT	437VU	212		21-63-00
14HK	SELECTOR-TEMP, FWD CABIN	437VU	212		21-63-00
15HK	SELECTOR-TEMP, MID CABIN	437VU	212		21-63-00
16HK	SELECTOR-TEMP, AFT CABIN	437VU	212		21-63-00
17HK	CONTROLLER-TEMP, COCKPIT	91VU	122	121BL	21-63-11
18HK	CONTROLLER-TEMP, FWD CABIN	91VU	122	121BL	21-63-11
19HK	CONTROLLER-TEMP, MID CABIN	91VU	122	121BL	21-63-11

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
20HK	CONTROLLER-TEMP, AFT CABIN	91VU	122	121BL	21-63-11
25HK	VALVE-TRIM AIR, COCKPIT		136	136AR	21-63-12
26HK	VALVE-TRIM AIR, FWD CABIN		136	136AR	21-63-12
27HK	VALVE-TRIM AIR, MID CABIN		135	136AR	21-63-12
28HK	VALVE-TRIM AIR, AFT CABIN		136	136AR	21-63-12
29HK	SENSOR-INLET TEMP CTL, COCKPIT		131	131HW	21-63-16
30HK	SENSOR-INLET TEMP CTL, FWD CABIN		132	132NW	21-63-16
31HK	SENSOR-INLET TEMP CTL, MID CABIN		131	131QW	21-63-16
32HK	SENSOR-INLET TEMP CTL, AFT CABIN		132	132QW	21-63-16
33HK	SENSOR-AMB TEMP CTL, COCKPIT	459VU	112		21-63-17
34HK	SENSOR-AMB TEMP CTL, FWD CAB		232		21-63-17
35HK	SENSOR-AMB TEMP CTL, MID CAB		242		21-63-17
36HK	SENSOR-AMB TEMP CTL, AFT CAB		252		21-63-17
55HK	IND-COMPT/DUCT TEMP	437VU	212		21-63-00
56HK	SWITCH-COMPT/DUCT TEMP SEL	437VU	212		21-63-00
62HK	SENSOR-AMB TEMP, MID CABIN		242		21-63-19
64HK	SENSOR-AMB TEMP, AFT CABIN		252		21-63-19
65HK	SENSOR-AMB TEMP, COCKPIT	459VU	112		21-63-19
66HK	SENSOR-AMB TEMP, FWD CABIN		232		21-63-19
23HN	SENSOR-DUCT TEMP, BULK CARGO		161	161DW	21-64-11
39HN	SENSOR-AMB TEMP, BULK CARGO		162	162BZ	21-64-12



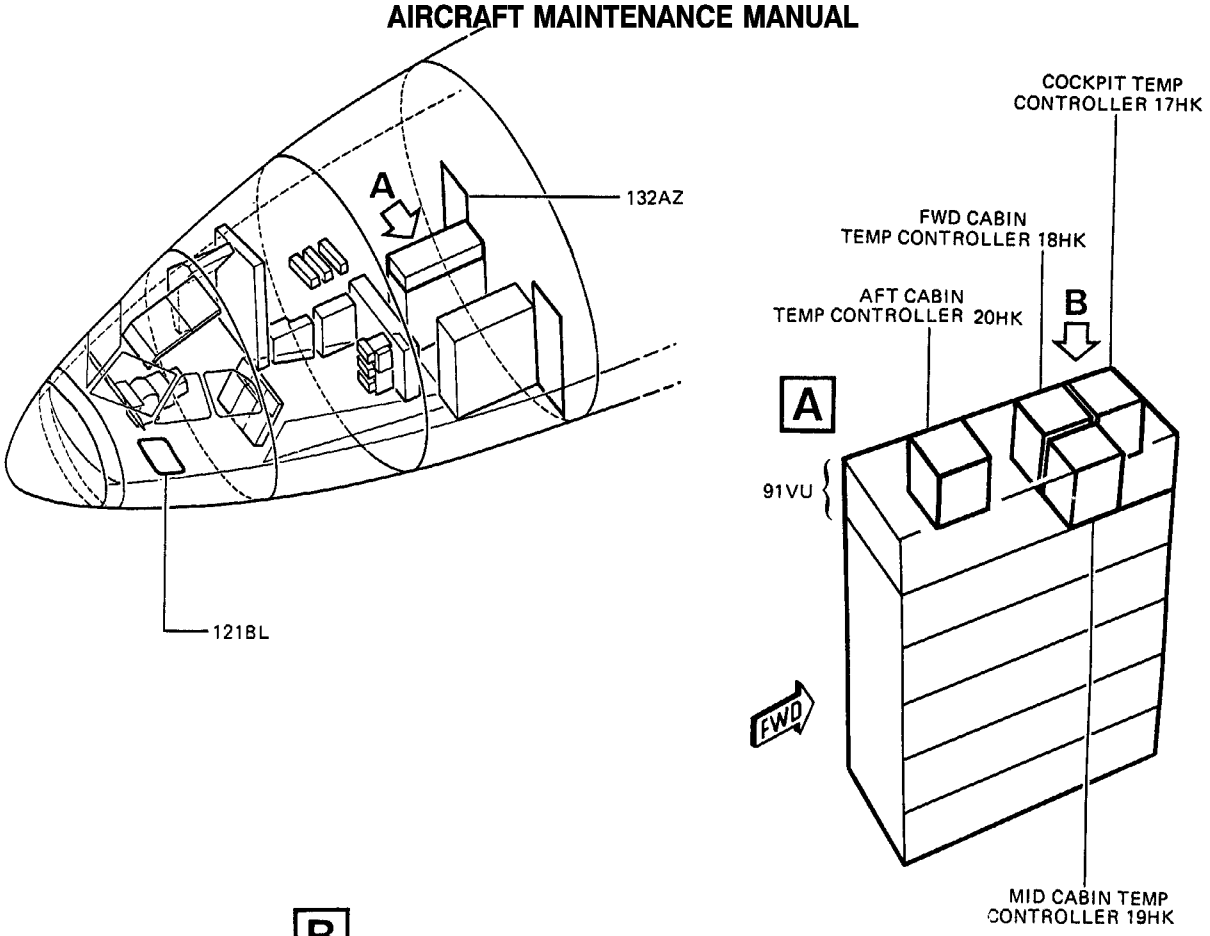
BM5 21 63 00 0 CANO - 01

Flight Compartment and Cabin Temperature Control - Control and Indicating
Figure 001



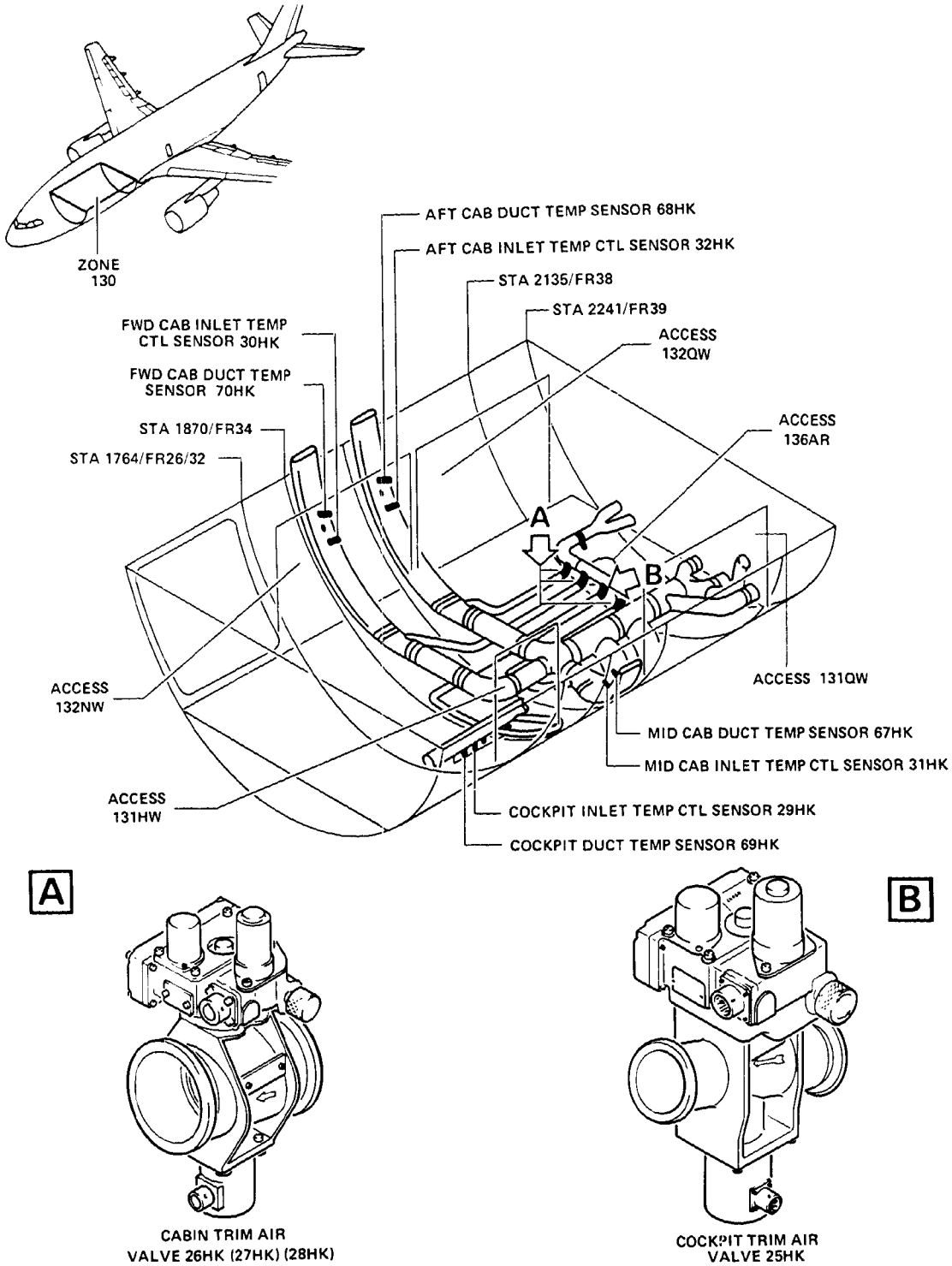
BM5 21 63 00 0 PAMO-18

Flight Compartment and Cabin Temperature Control - Control and Indicating
Figure 002



BM5 21 63 00 0 AFNO - 01

Flight Compartment and Cabin Temperature
Control - Controllers Location
Figure 003



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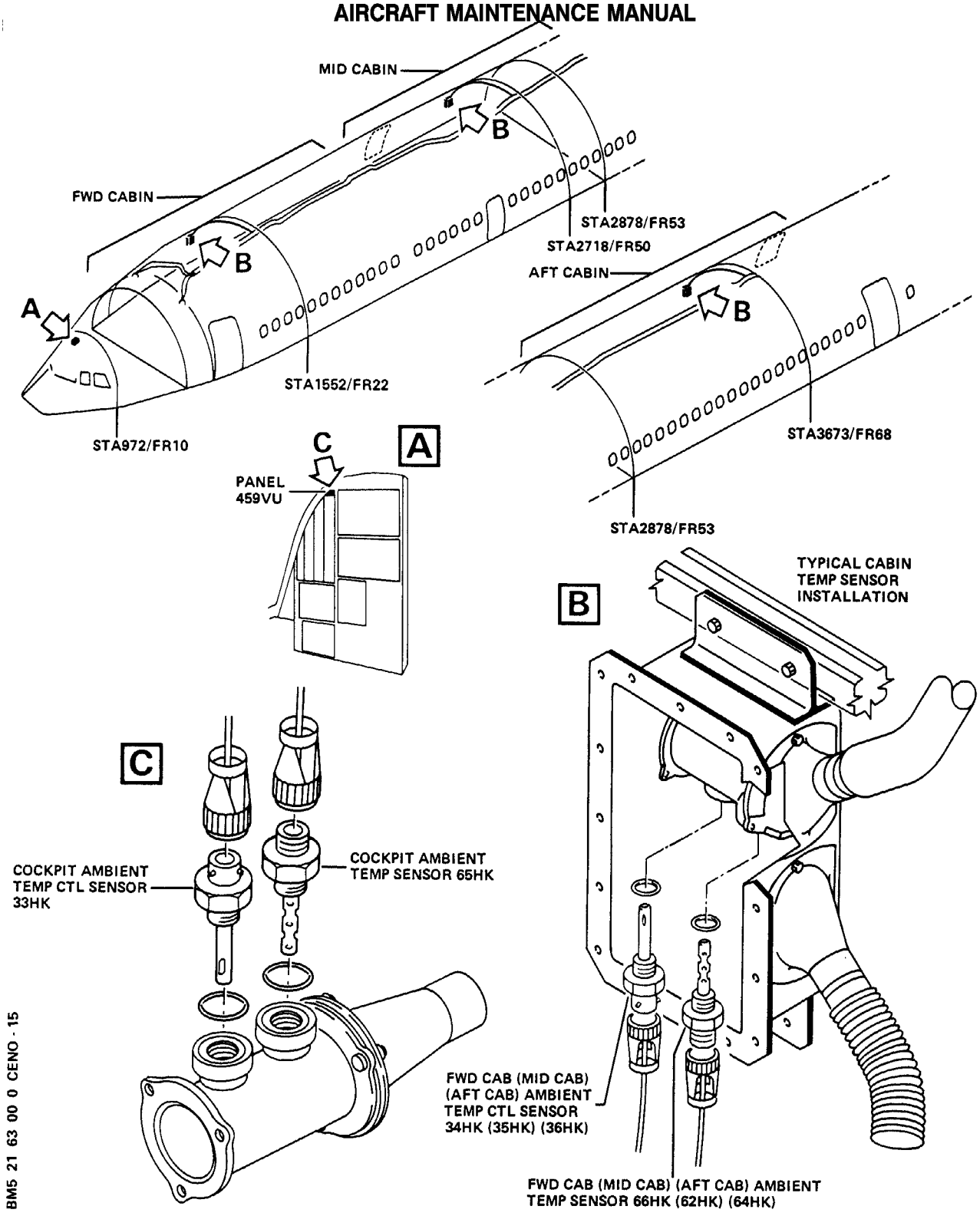
Flight Compartment and Cabin Temperature
Control - Component Location in FWD Cargo Compt
Figure 004



Flight Compartment and Cabin Temperature
Control - Component Location in Cabin
Figure 005

3. Description

A. Temperature Control

R **ON A/C 001-100,

(Ref. Fig. 006)

R **ON A/C 101-200,

(Ref. Fig. 007)

R **ON A/C ALL

Conditioning air is supplied to each of the four zones through a duct leading from the hot air manifold ; a trim air valve is installed in this duct :
COCKPIT (flight compartment) trim air valve 25HK
Forward cabin trim air valve 26HK
Mid cabin trim air valve 27HK
Aft cabin trim air valve 28HK.
The hot air duct is connected to the cold air duct before entering each zone in order to obtain the conditioning air at the desired temperature.
Each zone temperature control system mainly comprises :
- a temperature selector (AUTO/MAN)
- a temperature controller controlling a trim air valve
- an inlet temperature control sensor
- an ambient temperature control sensor.

B. Control and Indicating

R **ON A/C 001-100,

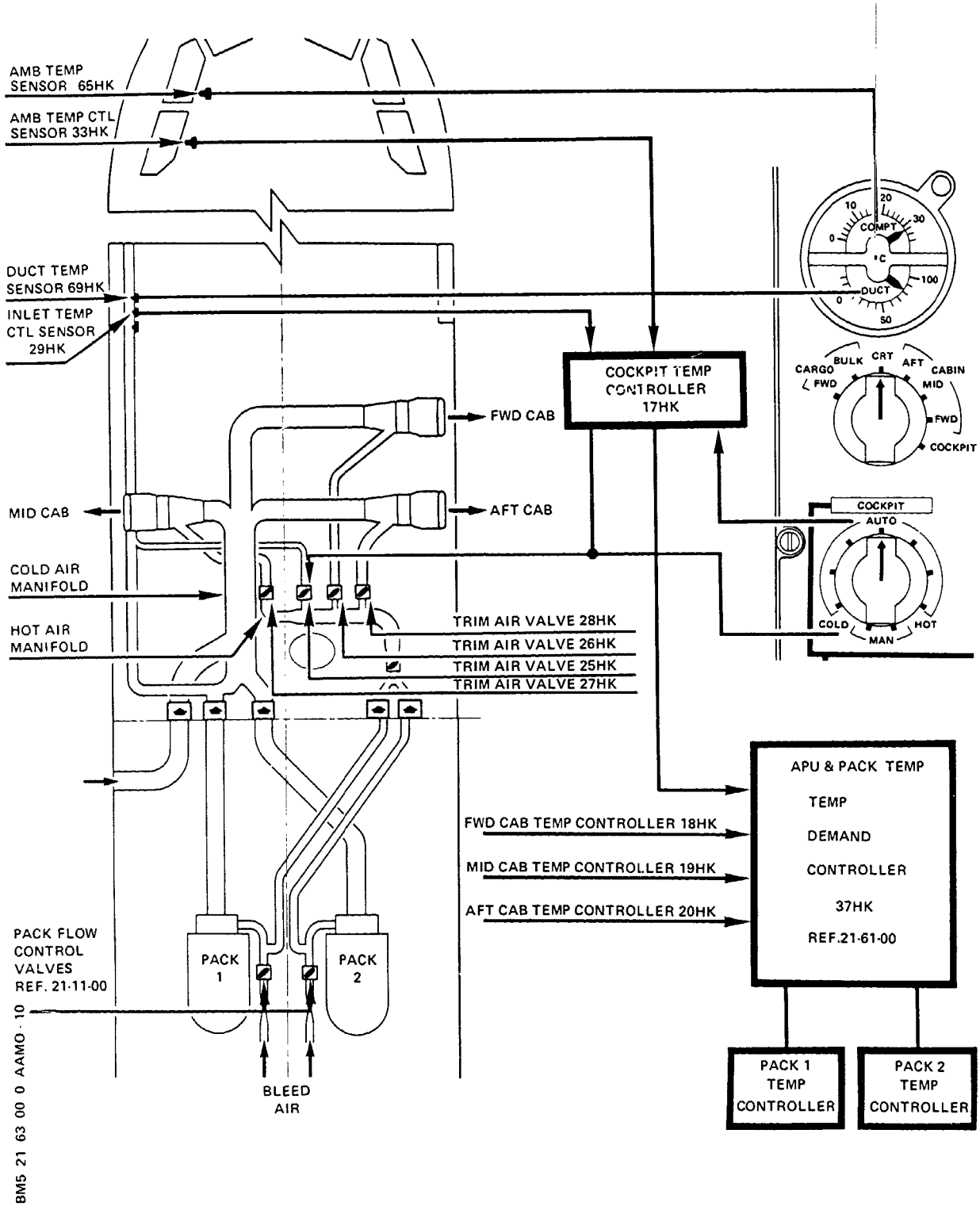
(Ref. Fig. 008)

R **ON A/C 101-200,

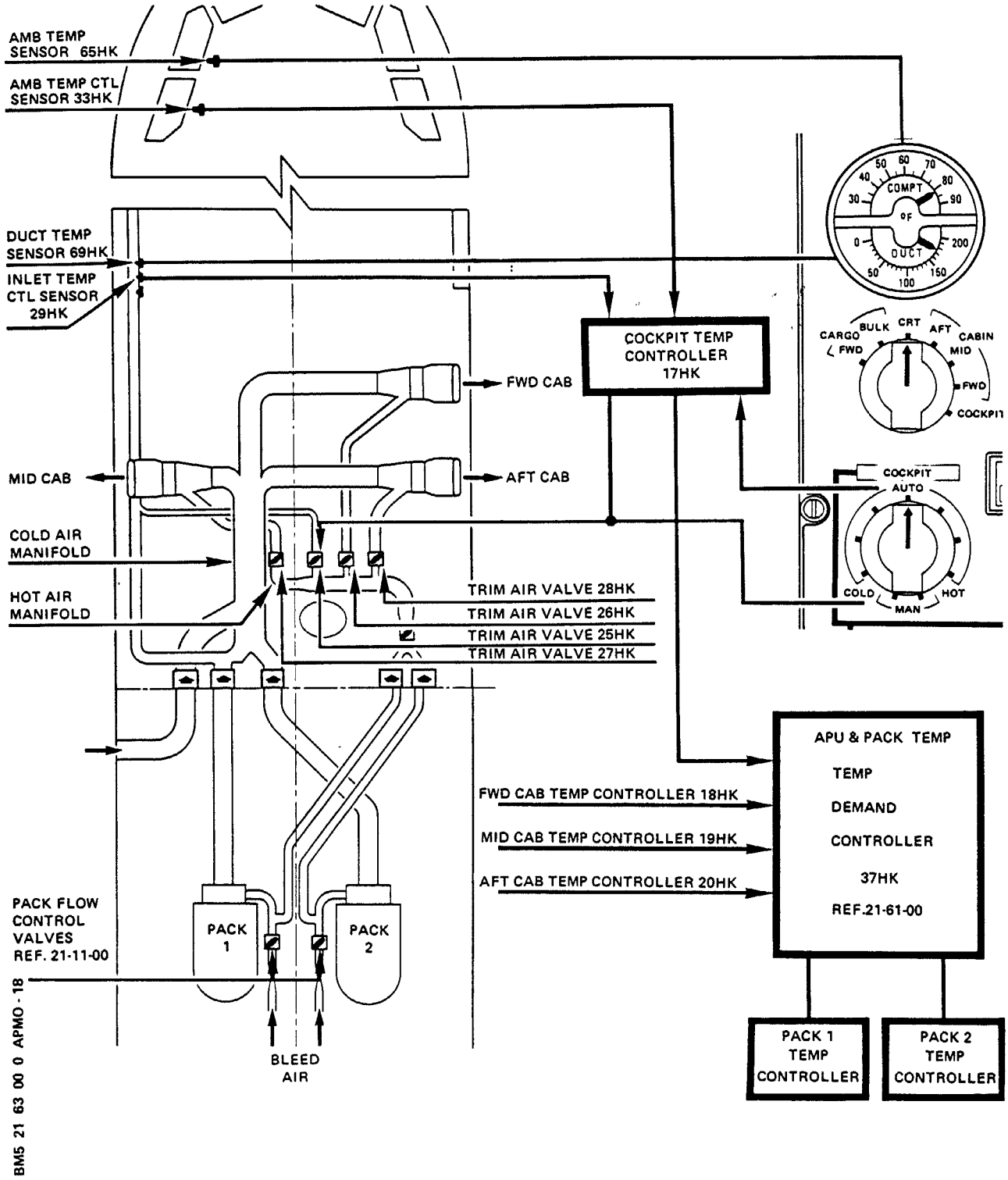
(Ref. Fig. 009)

R **ON A/C ALL

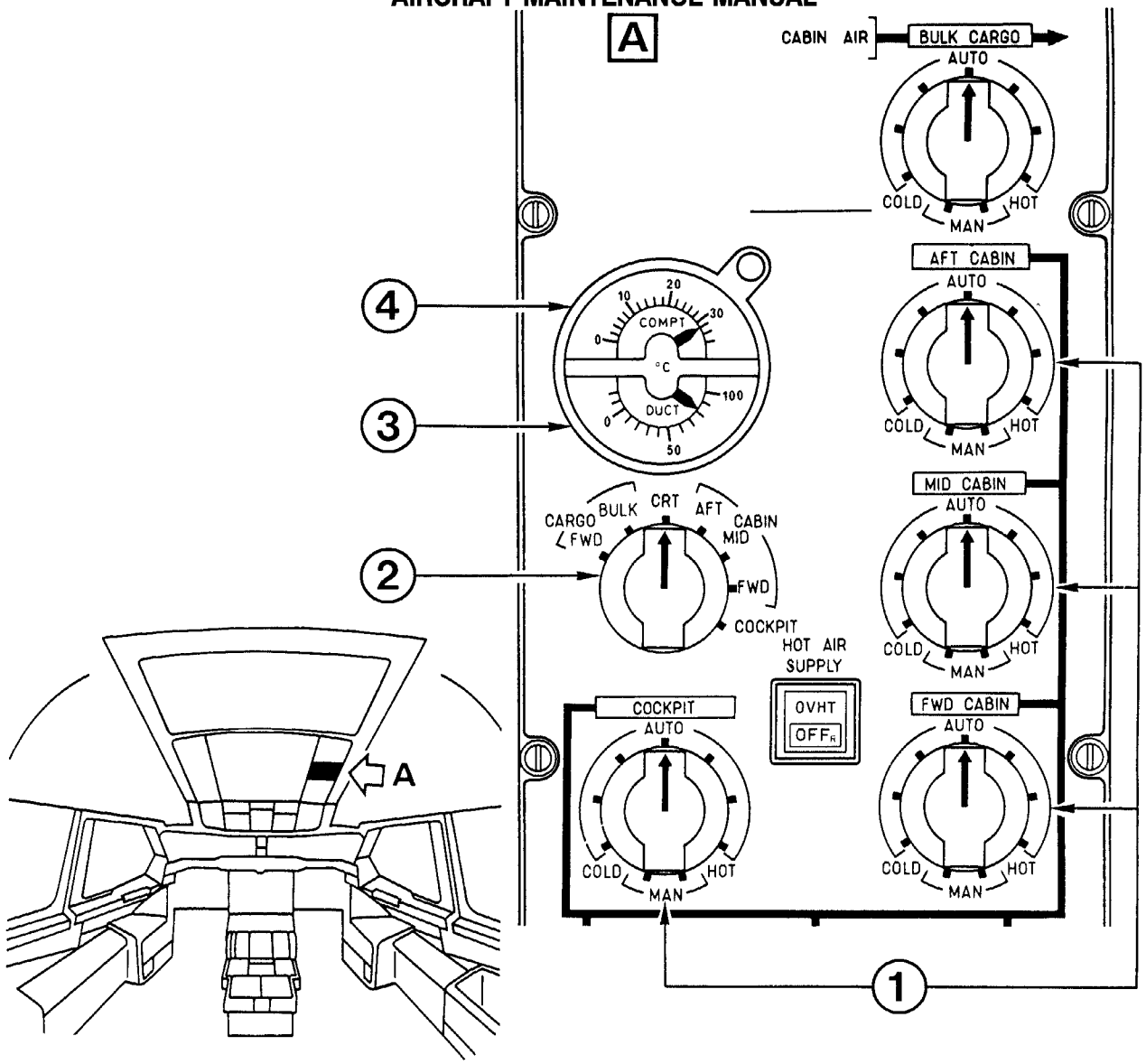
C. Indications on Right ECAM Display Unit
When the COMPT/DUCT temperature selector switch is in CRT position, indications and parameters relative to normal or abnormal operating conditions are displayed on the AIR COND page synoptic diagram on the right ECAM display unit :
- symbol identifying the flight compartment and the three cabin zones (CKPT, FWD, MID, AFT) and indications of zone duct temperature and zone ambient temperature.
- scale and arrow indicating the position of the trim air valve associated



Flight Compartment and Cabin Temperature Control - Airflow Diagram
Figure 006



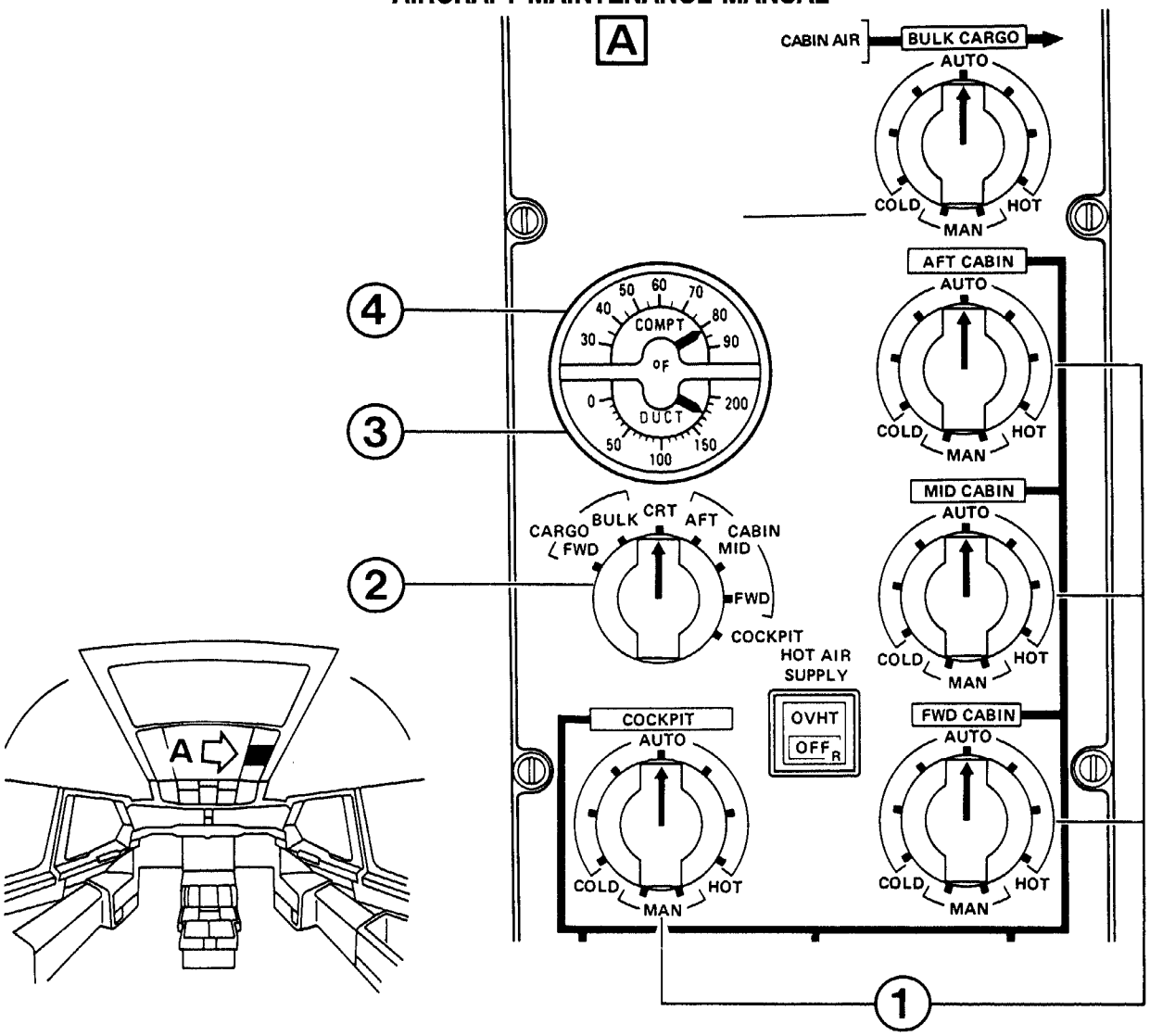
Flight Compartment and Cabin Temperature Control - Airflow Diagram
Figure 007



1. COCKPIT TEMPERATURE SELECTOR 13HK (FWD CABIN 16HK) (MID CABIN 15HK) (AFT CABIN 16HK) SERVES TO SELECT THE TEMPERATURE CONTROL MODE :
   - AUTO ; TEMPERATURE IS CONTROLLED IN AUTOMATIC MODE TO BETWEEN 18° C AND 29° C (65° F AND 80° F) :
   - MAN (SPRING-LOADED POSITION) ; TEMPERATURE IS CONTROLLED IN MANUAL MODE :
     - COLD POSITION : TRIM AIR VALVE CLOSURE
     - HOT POSITION : TRIM AIR VALVE OPENING.
2. COMPT/DUCT TEMPERATURE SELECTOR SWITCH SERVES TO SELECT THE ZONE FOR WHICH TEMPERATURE IS TO BE INDICATED OR TO SELECT TEMPERATURE DISPLAY ON THE RIGHT ECAM DISPLAY UNIT.
3. DUCT SECTION OF COMPT/DUCT TEMPERATURE INDICATOR READS THE INLET DUCT TEMPERATURE OF THE ZONE SELECTED.
4. COMPT SECTION OF COMPT/DUCT TEMPERATURE INDICATOR READS THE TEMPERATURE OF THE ZONE SELECTED.

BM5 21 63 00 0 ACNO - 01

COMPT TEMP Panel 437VU
Figure 008



1. COCKPIT TEMPERATURE SELECTOR 13HK (FWD CABIN 16HK) (MID CABIN 15HK) (AFT CABIN 16HK) SERVES TO SELECT THE TEMPERATURE CONTROL MODE :
   - AUTO ; TEMPERATURE IS CONTROLLED IN AUTOMATIC MODE TO BETWEEN 65 °F AND 80 °F
   - MAN (SPRING-LOADED POSITION) ; TEMPERATURE IS CONTROLLED IN MANUAL MODE :
     - COLD POSITION : TRIM AIR VALVE CLOSURE
     - HOT POSITION : TRIM AIR VALVE OPENING.
2. COMPT/DUCT TEMPERATURE SELECTOR SWITCH SERVES TO SELECT THE ZONE FOR WHICH TEMPERATURE IS TO BE INDICATED OR TO SELECT TEMPERATURE DISPLAY ON THE RIGHT ECAM DISPLAY UNIT.
3. DUCT SECTION OF COMPT/DUCT TEMPERATURE INDICATOR READS THE INLET DUCT TEMPERATURE OF THE ZONE SELECTED.
4. COMPT SECTION OF COMPT/DUCT TEMPERATURE INDICATOR READS THE TEMPERATURE OF THE ZONE SELECTED.

BM5 21 63 00 0 ACPO-18

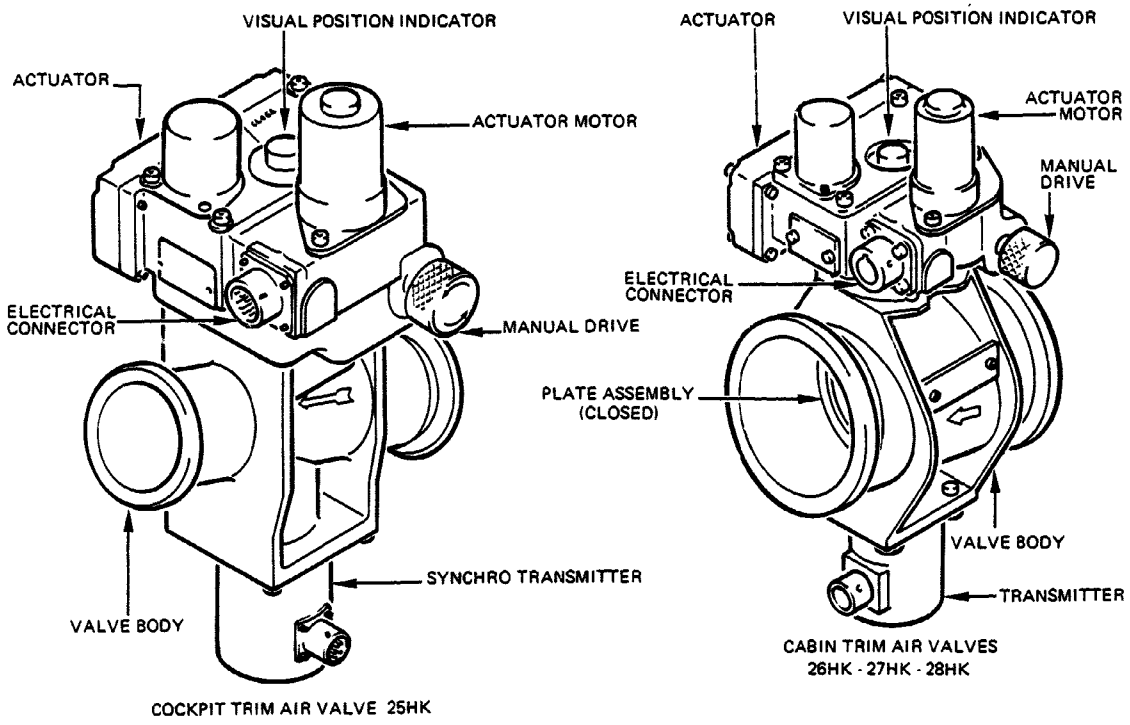
COMPT TEMP Panel 437VU
Figure 009

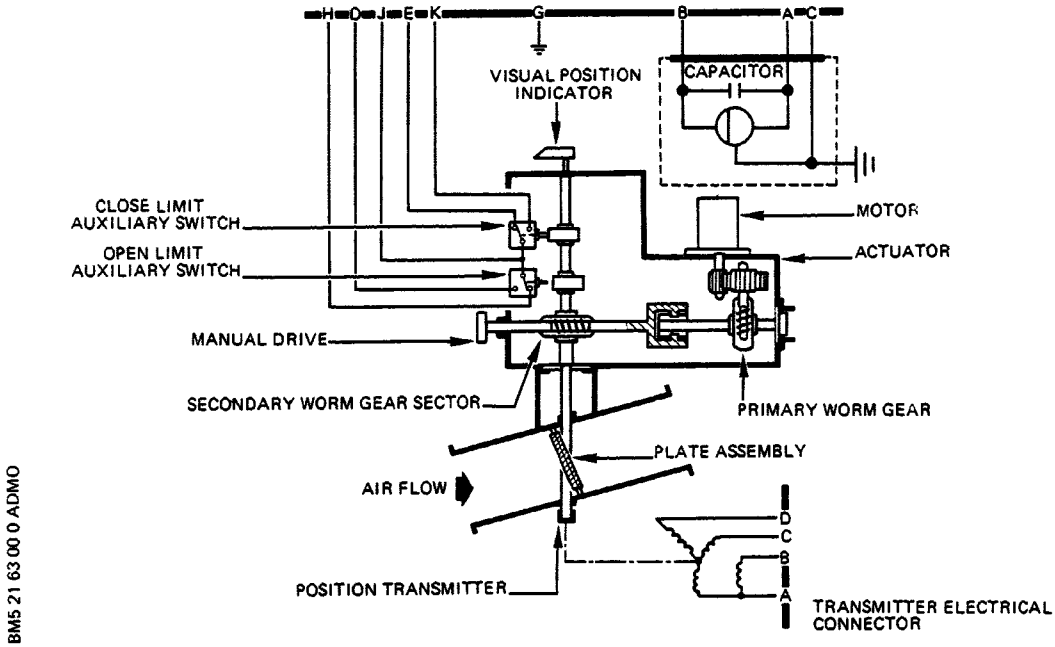
with each of the four zones (Ref. 31-51-00).

4. Component Description

A. Trim Air Valve 25HK (26HK, 27HK, 28HK) (Ref. Fig. 010)
In automatic mode, the trim air valve is controlled by associated temperature controller 17HK (18HK, 19HK, 20HK) ; the valve modulates the hot airflow admitted into the associated zone, function of the temperature demand selected within the AUTO range on temperature selector 13HK (14HK, 15HK, 16HK).
In manual mode, the trim air valve is directly controlled from temperature selector 13HK (14HK, 15HK, 16HK), MAN selected. In the event of automatic temperature control failure, the HOT and COLD positions of the selector operate the trim air valve to modulate the hot airflow.
The valve is of the butterfly type electrically operated by a 115VAC, 400Hz electric motor.
The actuator motor rotation (opening or closing direction) is transmitted to the cam shaft, the butterfly shaft and the manual drive.
The butterfly is driven in the opening or closing direction as long as power is applied to the actuator motor.
When the motor is no longer supplied the butterfly stops and remains in the position reached.
The visual position indicator rotates with the cam shaft and indicates the butterfly position.
The butterfly shaft drives the synchro transmitter which transmits a position signal to the right ECAM display unit (display of the AIR COND page). The trim air valve full opening or closing time is 16 to 24 seconds.
Two limit switches actuated by the cams, transmit a signal to temperature controller 17HK (18HK, 19HK, 20HK) which inhibits the motor control circuits when the trim air valve is in full open or full closed position.
The manual drive serves to rotate the cam shaft, the visual position indicator and the butterfly shaft.

B. Temperature Controller 17HK (18HK, 19HK, 20HK) (Ref. Fig. 003)
In automatic mode, the controller maintains the air temperature in the associated zone by comparing the selected zone temperature against the sensed zone temperature.
In manual mode the controller is bypassed. The controlled is an electronic assembly of modular construction, mounted on a chassis with a metal cover, and comprises :
a power module, an input module, a modulator module, a gate module, an output module and a test circuit.
The face of the controller features :
- an electrical connector for connection to the control system
- a BITE connector protected with dust cover when not in use.
The power module converts 115VAC, 400Hz from the aircraft electrical network to positive and negative 15.5, 15 and 1.9VDC.
The input module compares the demand signal from the temperature selectors with the zone temperature control sensor signal.
The output signal is generated and, if necessary, modified by inlet temperature sensor to prevent duct temperature reaching extreme limits during control action. Polarity and amplitude of the demand output signal





BM5 21 63 00 0 ADMO

Trim Air Valves - Schematic
Figure 010

determines the direction and rate of trim air valve actuator drive generated by the controller.
The modulator module comprises two integrated channels with a common input. The signal from the input module is processed and signals to actuator coils for operation of the trim air valve are generated.
The gate module comprises two separate channels, trim air valve close-drive and trim air valve open-drive, where drive signal is synchronized and inhibited when fully open or fully closed position is reached. The module contains an overcurrent protection circuit.
The output module comprises two identical channels close-drive and open-drive for the trim air valve, with overcurrent sensing transformers.

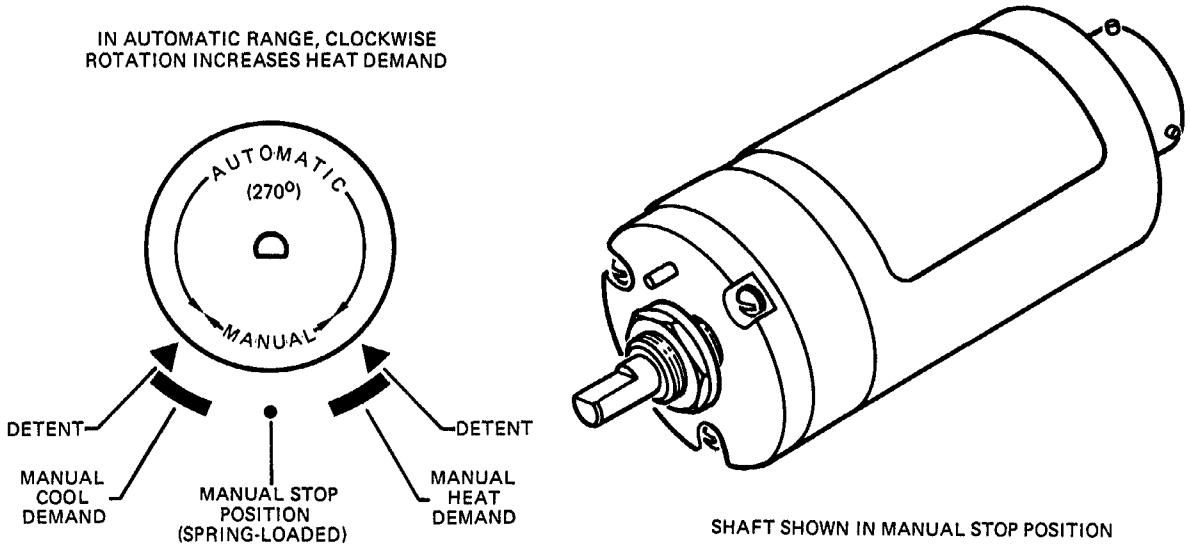
C. Temperature Selector 13HK (14HK, 15HK, 16HK)
(Ref. Fig. 011)
The selector enables the crew to adjust the trim air valve 25HK (26HK, 27HK, 28HK) in either the opening or closing direction, according to the associated zone ambient temperature displayed on the COMPT/DUCT temperature indicator.
The selector mainly consists of :
- a cylindrical casing incorporating an electrical connector and containing a potentiometer which forms one branch of a bridge circuit (the other branch comprises a sub-assembly of the controller.)

The face of the selector features :
- an AUTO range covering 270° at the upper part with seven equidistant dots and delimited by the inscriptions HOT and COLD ;
- a MAN range covering the remaining 90° at the lower part with two operating positions identified by the HOT and COLD inscriptions common to and separating, the two ranges.

In automatic mode, each time the selector position is changed the bridge is unbalanced and a signal is generated inside the selector. Numerical values are not displayed on the temperature selector. The selector is self-held in each position.
In manual mode (in the event of automatic temperature control failure), the selector directly operates the trim air valve actuator motor in the opening or closing direction, depending on whether COLD or HOT is selected ; these two positions are momentary (the selector is spring-loaded to neutral) ; when the selector is returned to the MAN position, the valve actuator motor power supply is cut off and the butterfly remains in the position reached.

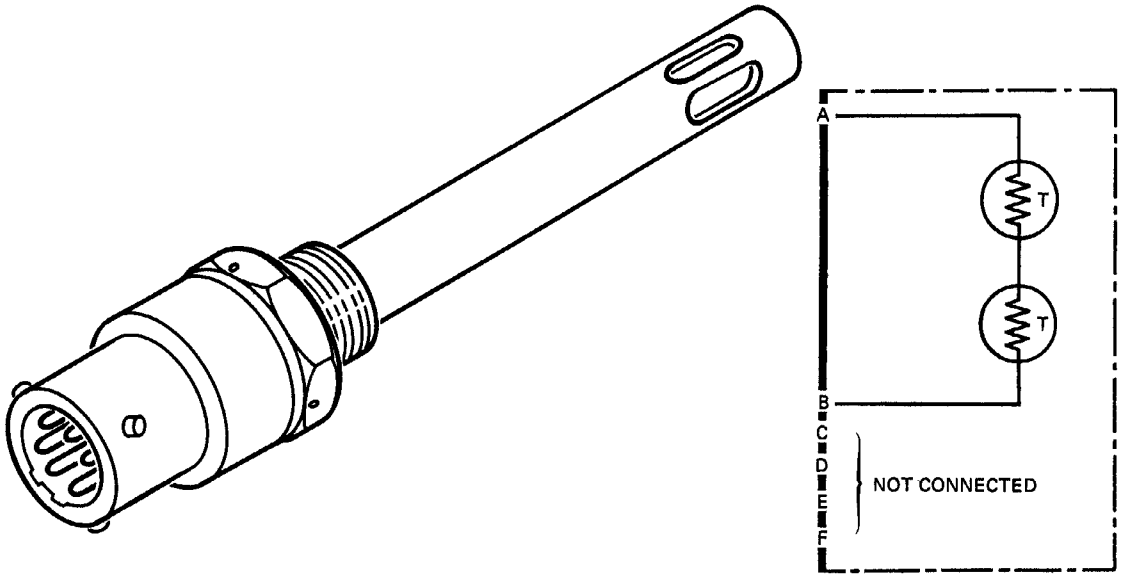
D. Zone Inlet Temperature Control Sensor 29HK (30HK, 31HK, 32HK)
(Ref. Fig. 012)
The sensor senses air temperature in the zone inlet duct and transmits the information to associated zone temperature controller 17HK (18HK, 19HK, 20HK) for monitoring and control of the associated zone temperature. The sensing element is mounted in a cylindrical plunger and comprises two thermistor beads the resistance of which varies with the temperature.

E. Zone Ambient Temperature Control Sensor 33HK (34HK, 35HK, 36HK)
(Ref. Fig. 013)
The sensor senses air temperature in the zone and transmits the information to associated zone temperature controller 17HK (18HK, 19HK, 20HK) for



BM5 21 63 00 0 AHMO - 00

Temperature Selector 13HK (14HK, 15HK, 16HK)
Figure 011



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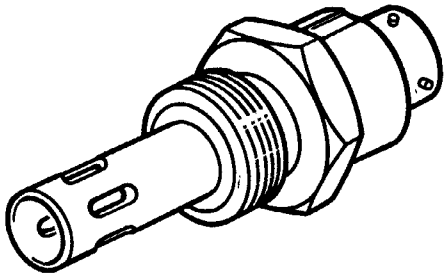
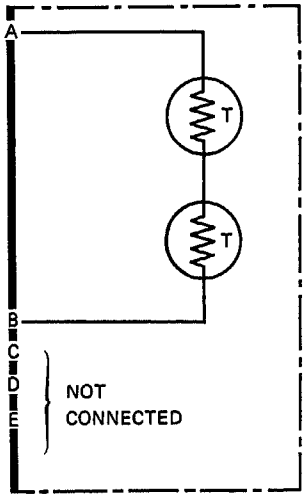
Zone Inlet Temperature Control Sensor 29HK (30HK, 31HK, 32HK)
Figure 012





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Zone Ambient Temperature Control Sensor 33HK (34HK, 35HK, 36HK)
Figure 013

monitoring and control of the associated zone temperature. The sensing element is mounted in a cylindrical plunger and consists of two thermistor beads the resistance of which varies with the temperature.

F. Zone Duct Temperature Sensor 67HK (68HK, 69HK, 70HK, 23HN)

R **ON A/C 001-100,

(Ref. Fig. 014)

R **ON A/C 101-200,

(Ref. Fig. 015)

R **ON A/C ALL

The sensor senses air temperature in the zone inlet duct and transmits the information to the COMPT/DUCT temperature indicator or to the right ECAM display unit depending on the position selected on COMPT/DUCT temperature selector switch 56HK.
A sensor is installed in each zone distribution duct. The sensor mainly consists of a stainless steel tube-mounted resistor which varies with the temperature.

R **ON A/C 001-100,

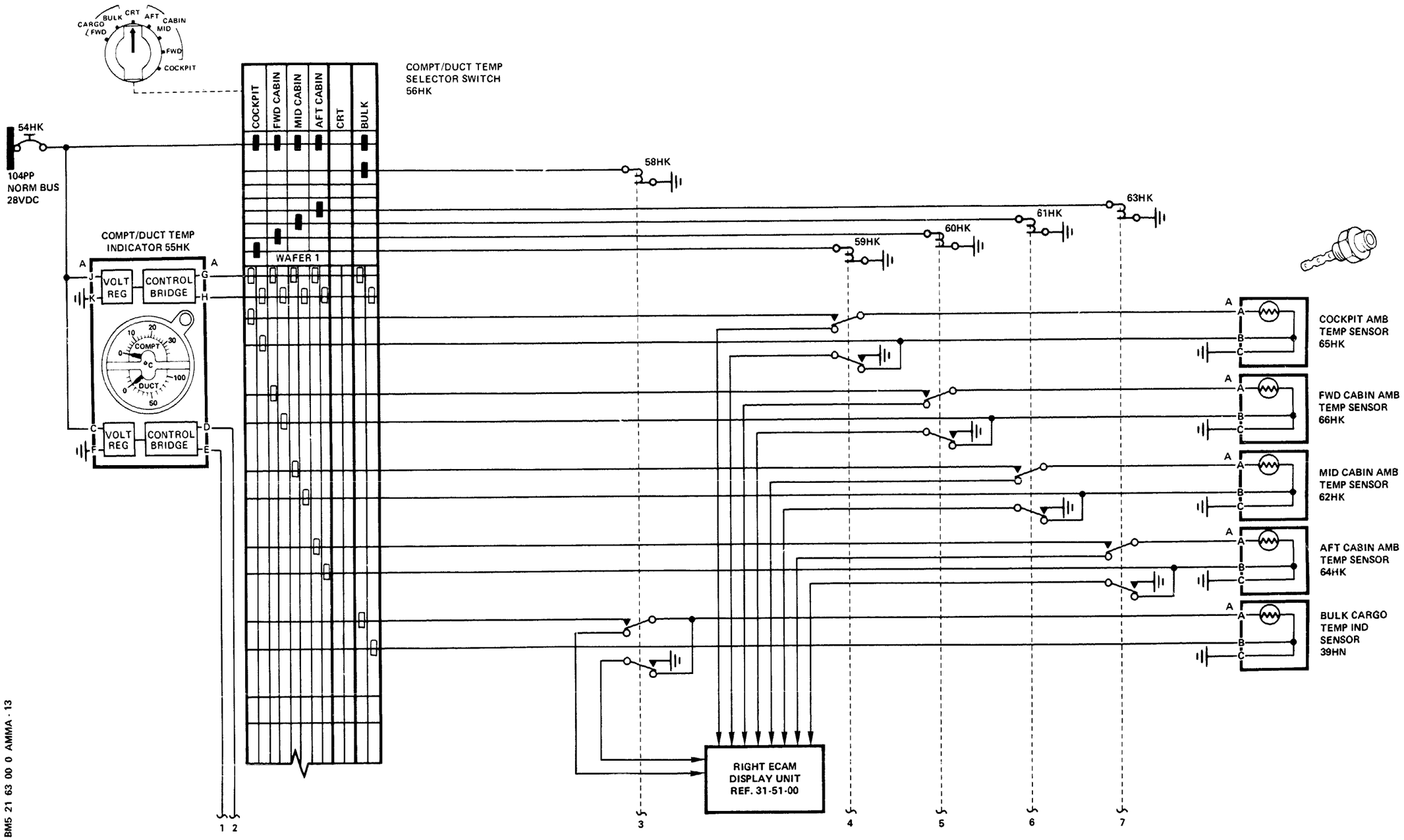
G. Zone Ambient Temperature Sensor 62HK (64HK, 65HK, 66HK, 39HN)
(Ref. Fig. 014)
The sensor senses the zone ambient temperature and transmits the information to the COMPT/DUCT temperature indicator or to the right ECAM display unit depending on the position selected on COMPT/DUCT temperature selector switch 56HK.
A sensor is installed in each zone. The sensor mainly consists of a stainless steel tube-mounted resistor which varies with the temperature.

H. COMPT/DUCT Temperature Indicator 55HK (Ref. Fig. 014)

R **ON A/C 101-200,

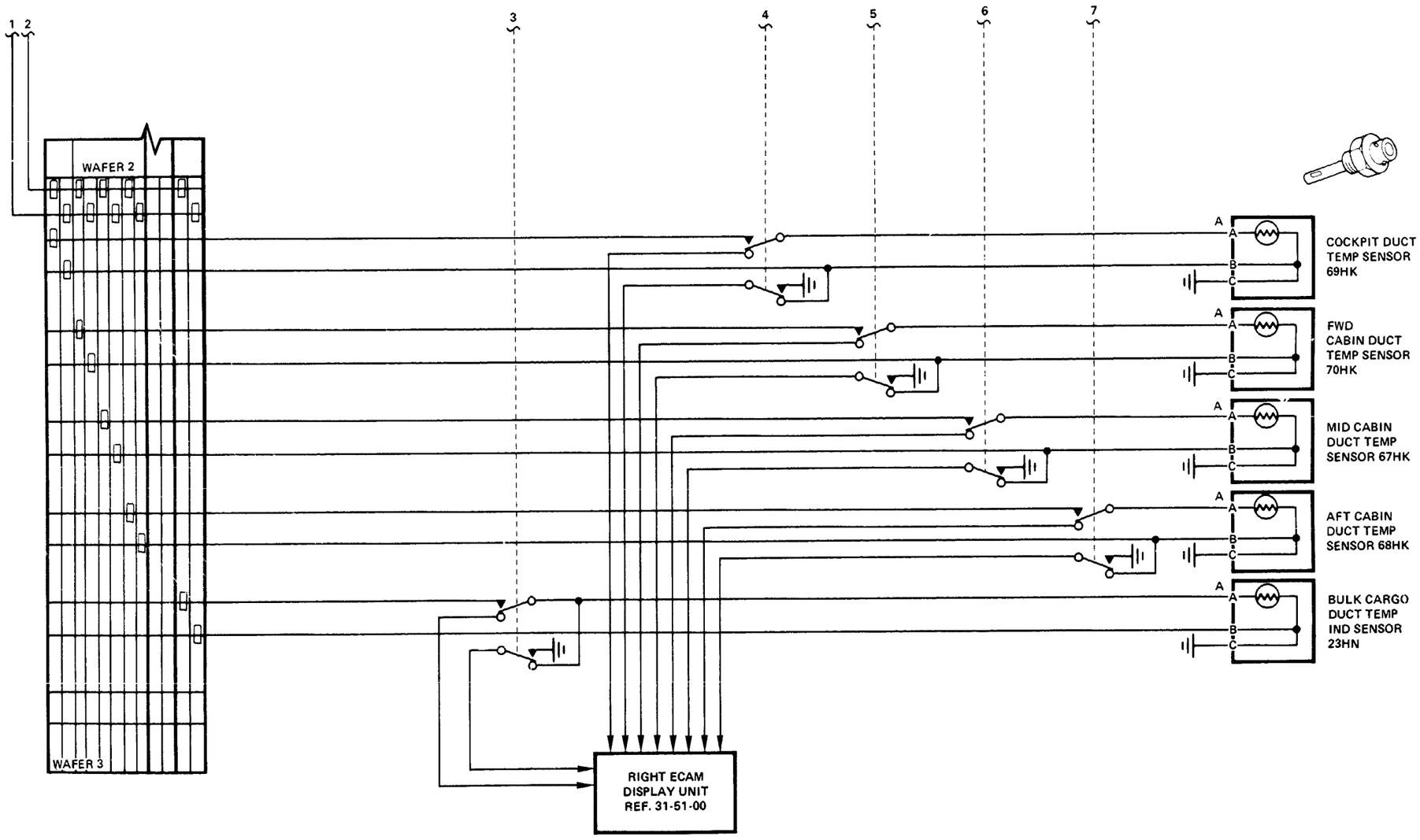
G. Zone Ambient Temperature Sensor 62HK (64HK, 65HK, 66HK, 39HN)
(Ref. Fig. 015)
The sensor senses the zone ambient temperature and transmits the information to the COMPT/DUCT temperature indicator or to the right ECAM displayunit depending on the position selected on COMPT/DUCT temperature selector switch 56HK.
A sensor is installed in each zone. The sensor mainly consists of a stainless steel tube-mounted resistor which varies with the temperature.

H. COMPT/DUCT Temperature Indicator 55HK (Ref. Fig. 015)



BM5 21 63 00 0 AMMA . 13

Temperature Indication - Schematic, Sheet 1/2
Figure 014



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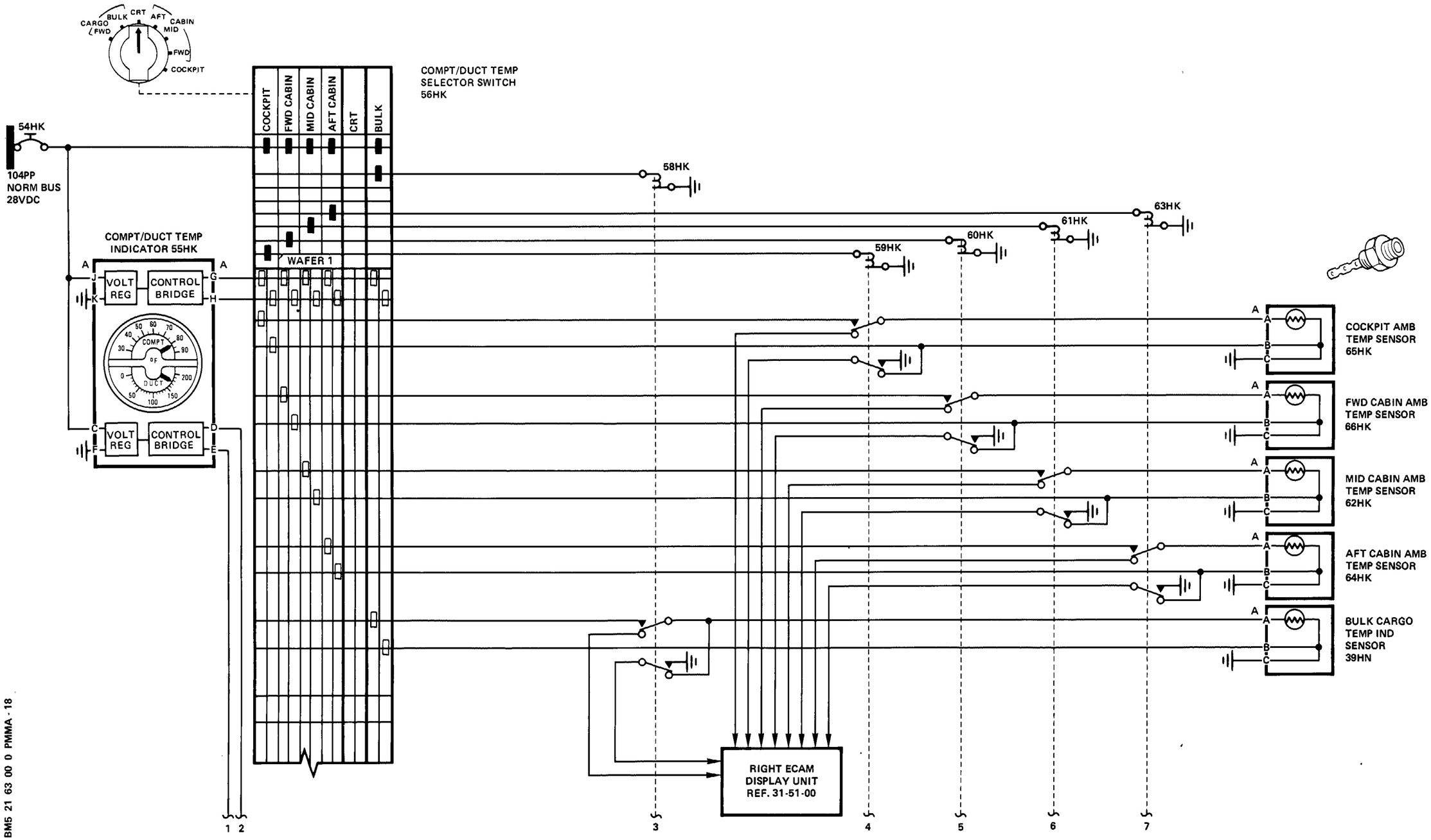
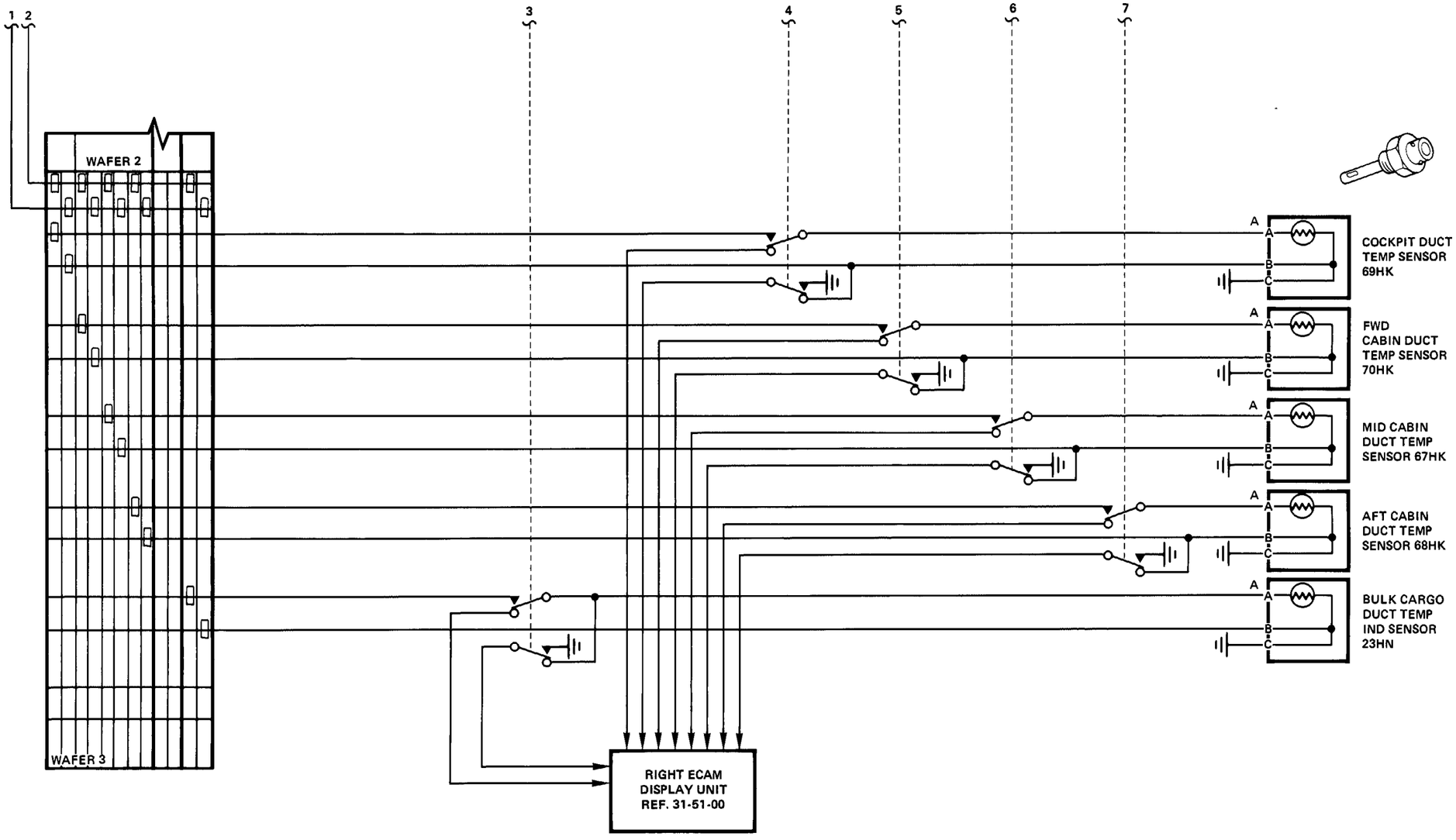
Temperature Indication - Schematic, Sheet 2/2
Figure 014



BM5 21 63 00 0 PMMA-18

Temperature Indication - Schematic, Sheet 1/2
Figure 015



BM5 21 63 00 0 PMMJ-18

Temperature Indication - Schematic, Sheet 2/2
Figure 015

R **ON A/C ALL

This dual indicator enables the crew to monitor the zone inlet duct temperature and the zone ambient temperature. The dual indicator operates in conjunction with two sensors of the resistor type which provide information on two separate channels.

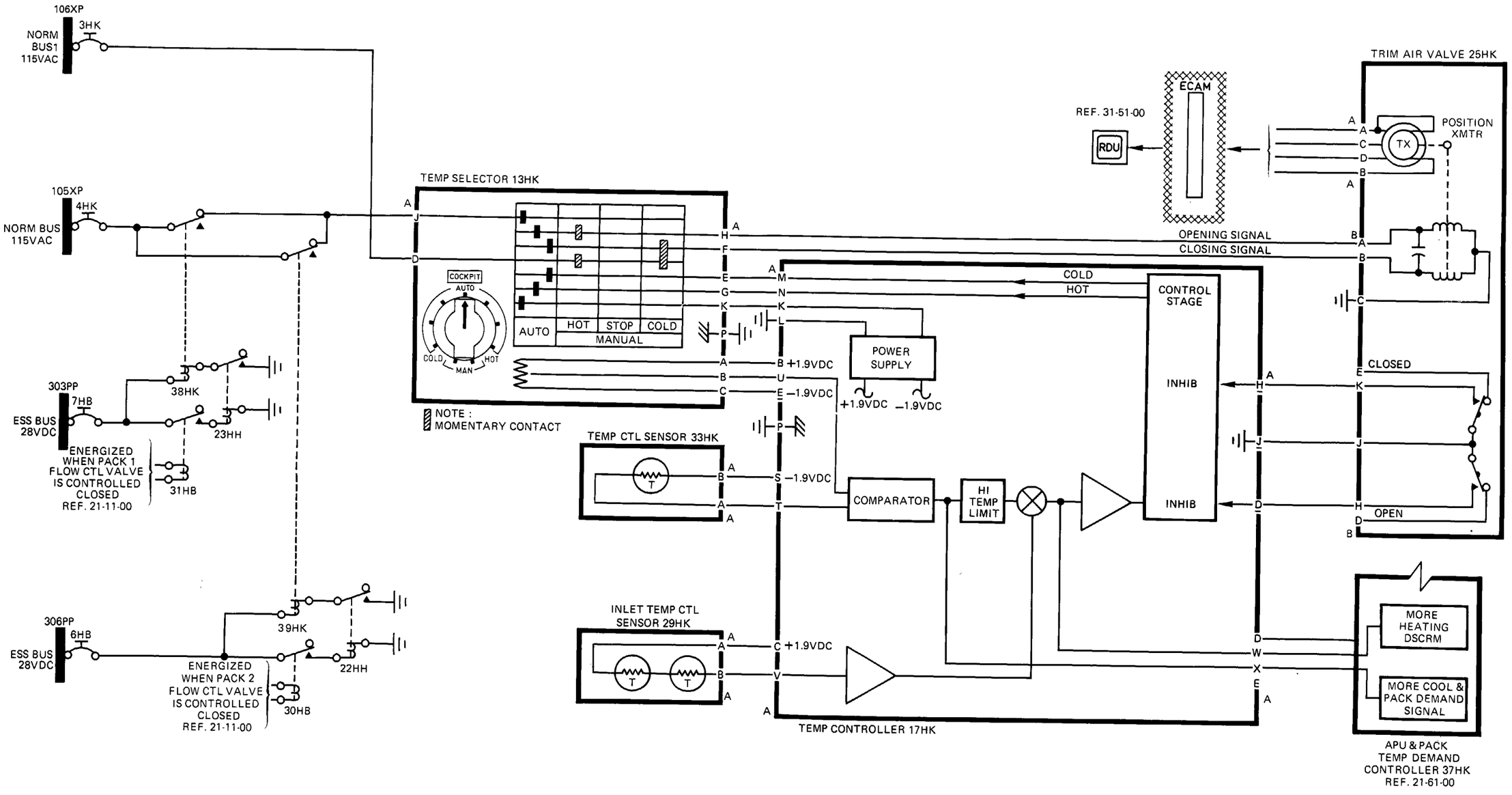
NOTE : The COMPT/DUCT temperature selector switch serves to select the zone for which temperature is to be indicated.

5. Operation
(Ref. Fig. 016)
(Ref. Fig. 017)
(Ref. Fig. 018)
(Ref. Fig. 019)

A. General
The flight compartment, forward cabin, mid cabin and aft cabin are controlled in temperature by the crew members who select the temperature demand on the zone temperature selectors ; a more heat or more cool demand can be selected to obtain the desired air temperature.
Automatic control is possible at any temperature selection setting between 18°C and 29°C (65°F and 80°F).
Conditioning of the four zones is obtained by mixing cold and hot air sources ; trim air valves 25HK, 26HK, 27HK and 28HK meter the admission of hot air to meet the temperature demand.

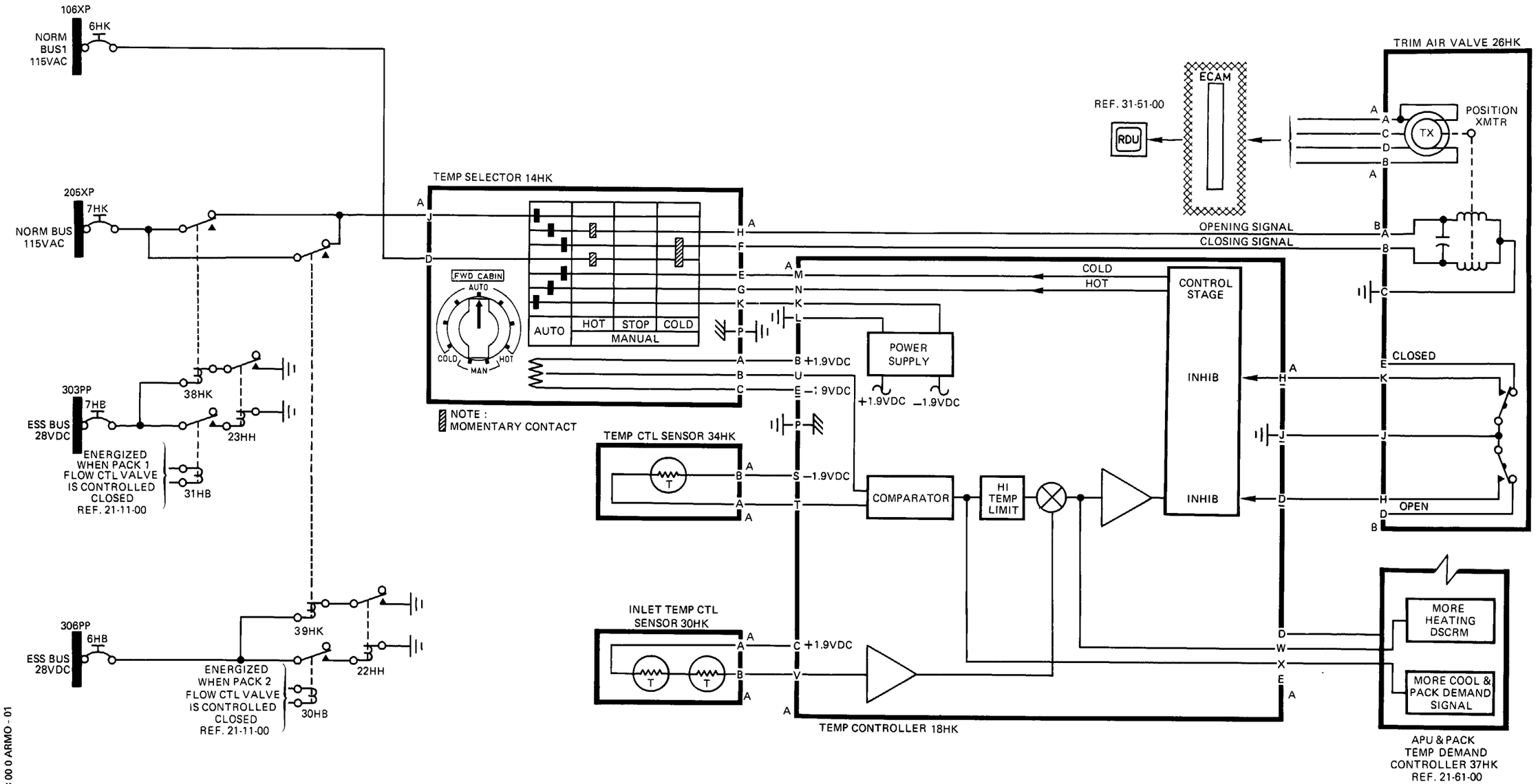
B. Automatic Control
The temperature signal generated by temperature selector 13HK (14HK, 15HK, 16HK) is fed into associated temperature controller 17HK (18HK, 19HK, 20HK) and compared with the sensed temperature signals from inlet temperature control sensor 29HK (30HK, 31HK, 32HK) and ambienttemperature control sensor 33HK (34HK, 35HK, 36HK) in order to generate a temperature error signal. The output demand signal from the controller is transmitted to associated trim air valve 25HK (26HK, 27HK, 28HK) to drive the valve in the open or close direction.
When the trim air valve is full open or full closed, the limit switches in the valve provide a feedback signal to the controller. The feedback serves to inhibit operation of the control circuits by removing the open or close drive demand signal from the valve. The zone temperature controller also delivers a more heat or more cool demand signal to the APU and pack temperature demand controller (Ref. 21-61-00).
NOTE : If, of all zones, the flight compartment demands the lowest temperature, refrigeration unit pack 1 temperature is controlled by the flight compartment.
Pack 2 temperature is controlled by the cabin zone (one of three) demanding the lowest temperature.
If, of all zones, one of the three cabin zones demands the lowest temperature, pack 1 and 2 temperature is controlled by that zone.
APU and pack temperature demand controller 37HK identifies the zone demanding the lowest temperature, function of the signals delivered by the four zones (ref. 21-61-00).

C. Manual Control
In the event of failure of the automatic temperature control, the crew continues to maintain the desired temperature in the zone concerned by acting directly on the trim air valve via the temperature selector MAN range COLD or HOT momentary position.



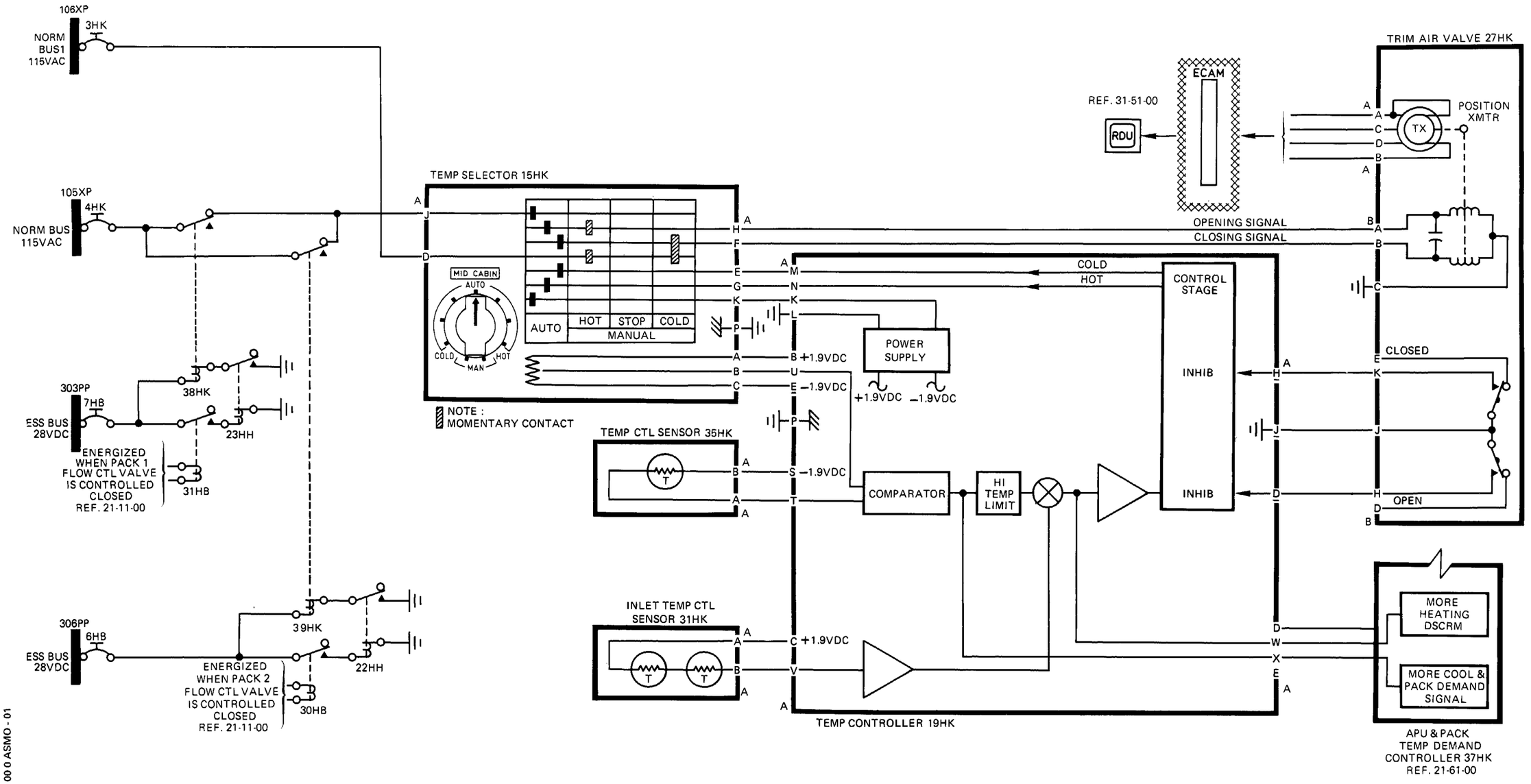
BM5 21 63 00 0 AQMO - 01

Flight Compartment Temperature Control - Schematic
Figure 016



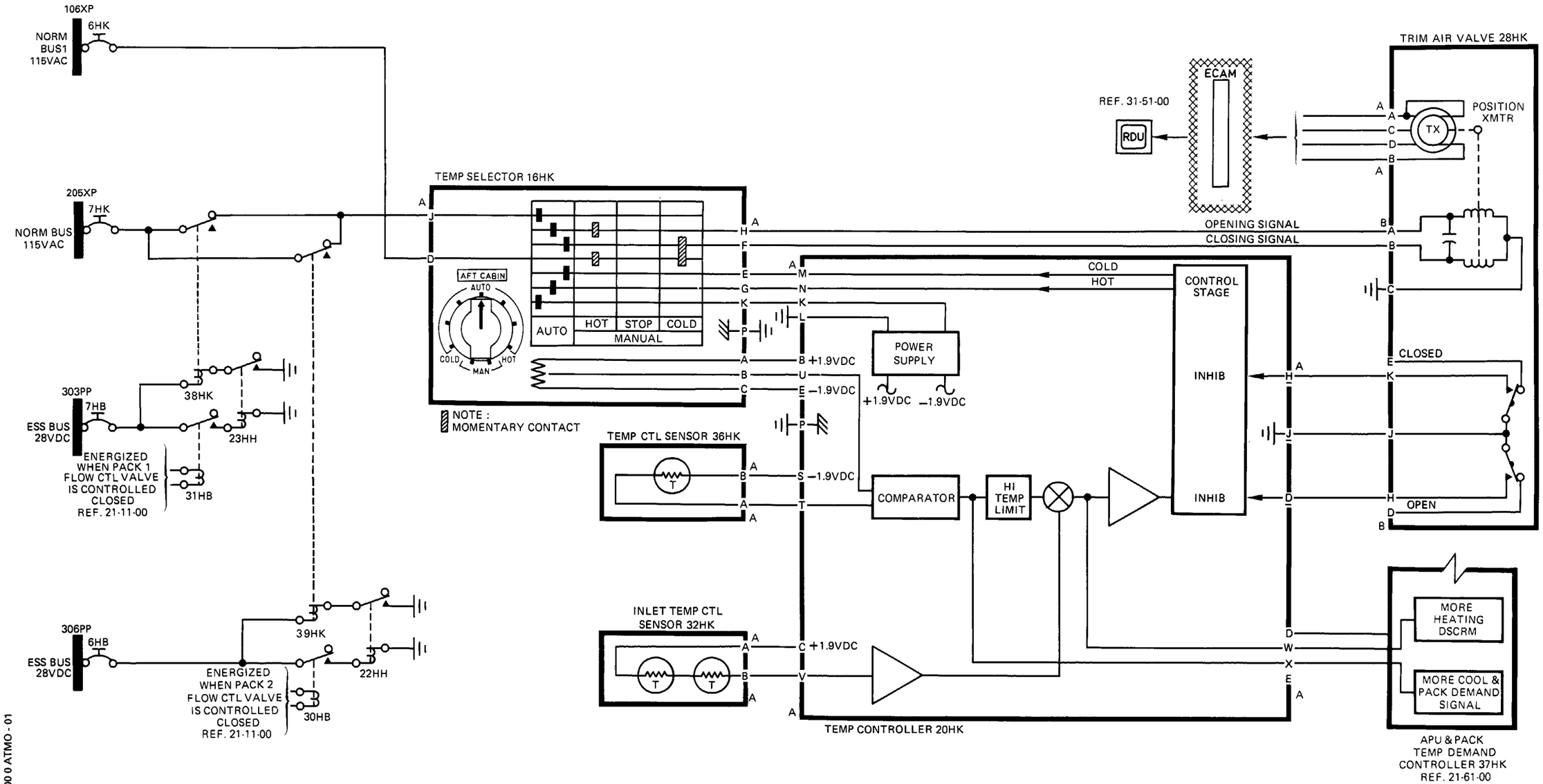
BMS 21 63 00 0 ARMO - 01

Forward Cabin Temperature Control - Schematic
Figure 017



BM5 21 63 00 0 ASMO - 01

Mid Cabin Temperature Control - Schematic
Figure 018



BM5 21 63 00 0 ATMO - 01

Aft Cabin Temperature Control - Schematic
Figure 019

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : USE EXTREME CARE WHEN WORKING WITH CLEANING AGENT No. 11-002. THE SOLVENT VAPORS ARE TOXIC AND FLAMMABLE. MAKE CERTAIN THAT WORKING AREA IS WELL VENTILATED. DO NOT INHALE FUMES, MIST OR DUST. PROTECT EYES AND SKIN. APPLY ONLY IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS. FIRE PROTECTION REGULATIONS MUST BE OBSERVED.

1. Reason for the Job

Cleaning of air inlet grids, suction lines, housings.
Ambient Temperature Control Sensor 33HK (34HK) (35HK) (36HK).
Ambient Temperature Sensor 65HK, (66HK) (62HK) (64HK).
Zone Inlet Temperature Control Sensor 29HK, (30HK), (31HK), (32HK).
Zone Duct Temperature Sensor 67HK, (68HK), (69HK), (70HK).

2. Equipment and Materials

ITEM	DESIGNATION
A.	Air Compressor
B.	Vacuum Cleaner
C.	Torque Wrench - 1 m.daN (88.5 lbf. in.)
D.	Torque Wrench - 1.35 m.daN (120 lbf. in.)
E.	Lockwire Dia 0.8 mm (0.0030 in.)
F.	O-Ring
G.	Blanking Plugs/Caps
H.	Warning Notices
J. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

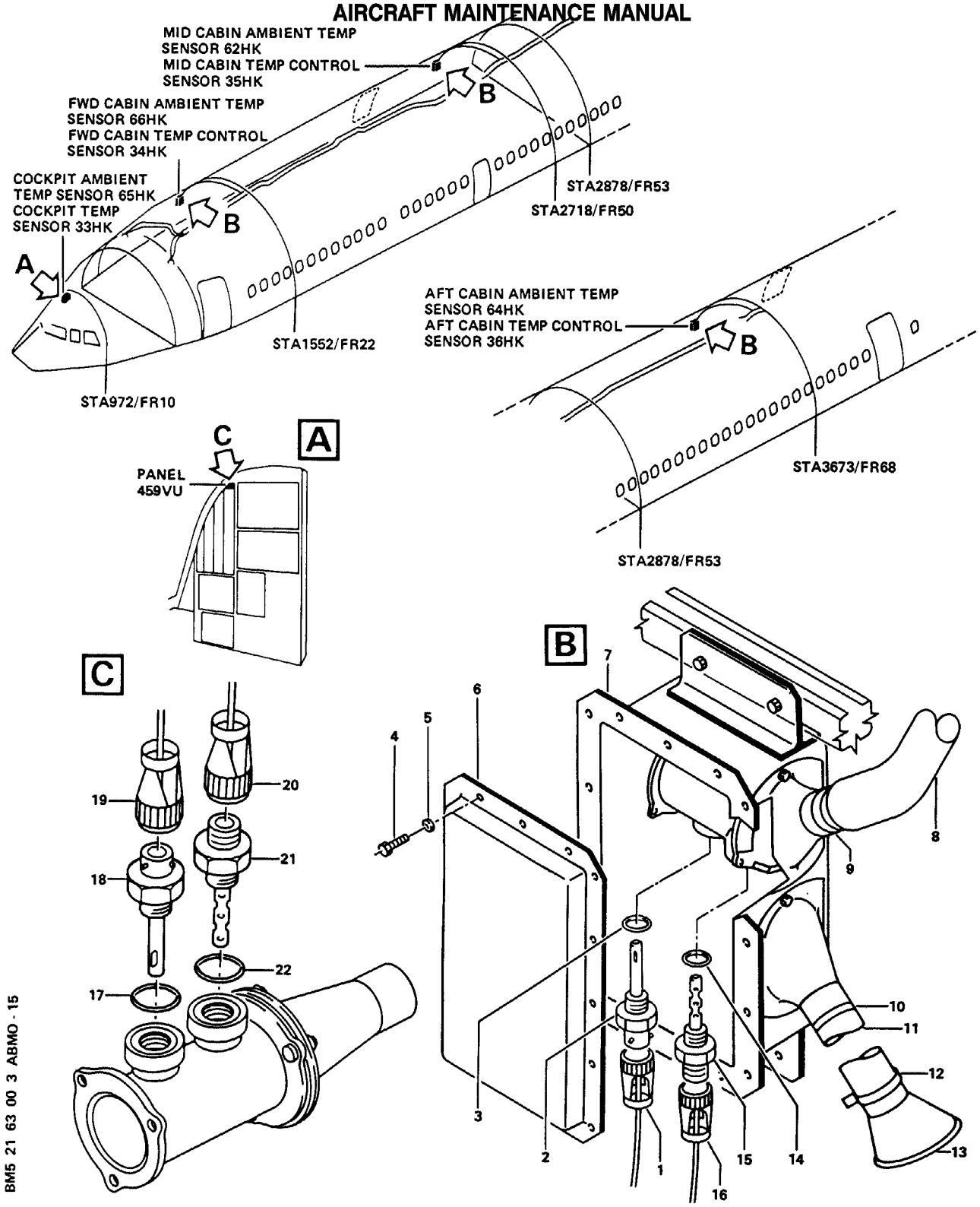
Referenced Procedures

- 21-63-16, P. Block 401	Zone Inlet Temperature Control Sensor
- 21-63-17, P. Block 401	Ambient Temperature Control Sensor
- 21-63-18, P. Block 401	Zone Duct Temperature Sensor
- 21-63-19, P. Block 401	Ambient Temperature Sensor
- 25-23-11, P. Block 401	Ceiling Panels
(Ref. Fig. 301)	
(Ref. Fig. 302, 303)	

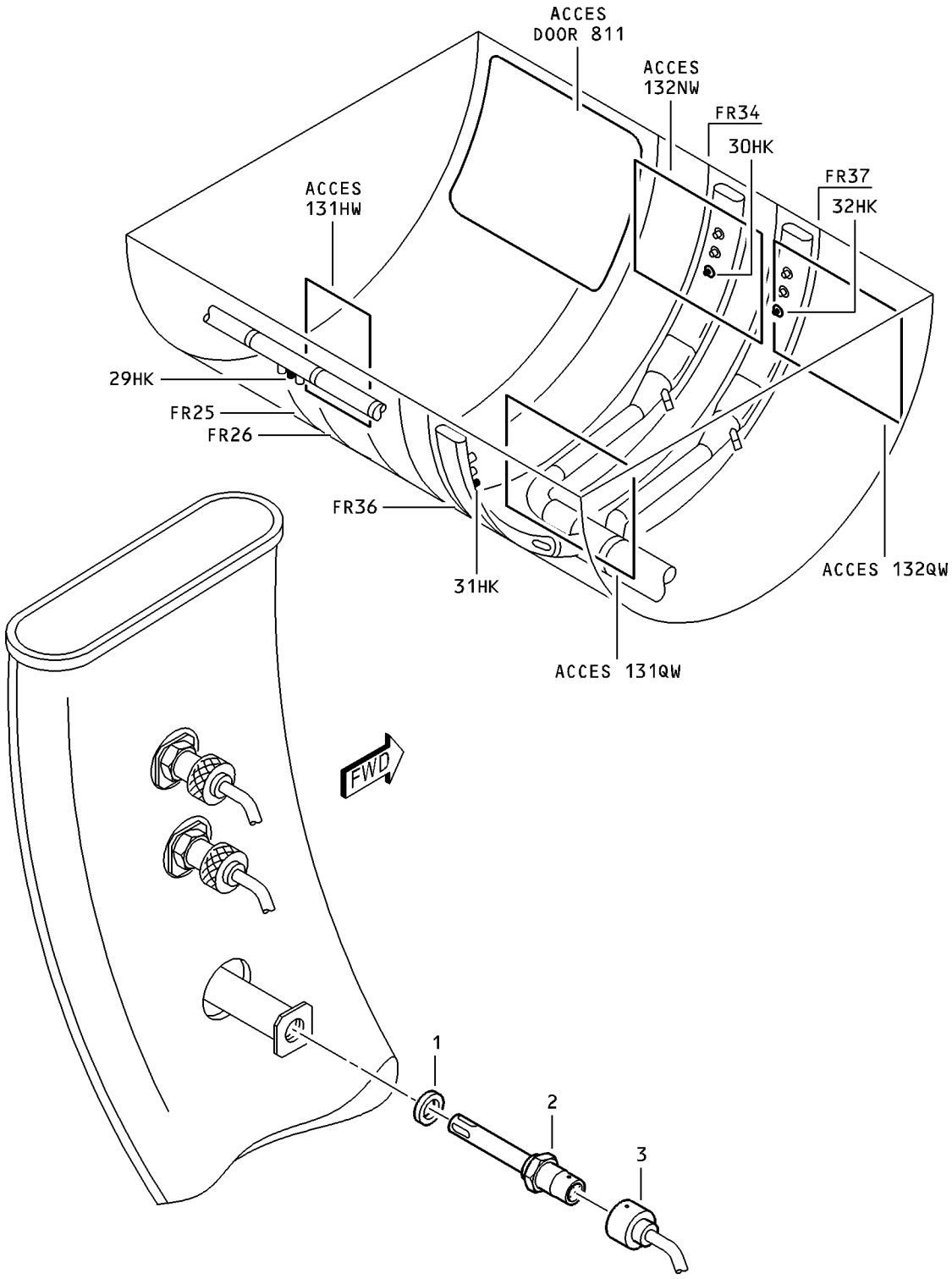
A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP/COCKPIT & MID CABIN/AUTO CTL	4HK	313/F54
131VU	COMPT TEMP/COCKPIT & MID CABIN/MAN CTL	3HK	313/F53
131VU	COMPT TEMP/FWD & AFT CABIN/AUTO CTL	7HK	313/F58
131VU	COMPT TEMP/FWD & AFT CABIN/MAN CTL	6HK	313/F52
131VU	COMPT TEMP/TEMP IND	54HK	311/H58

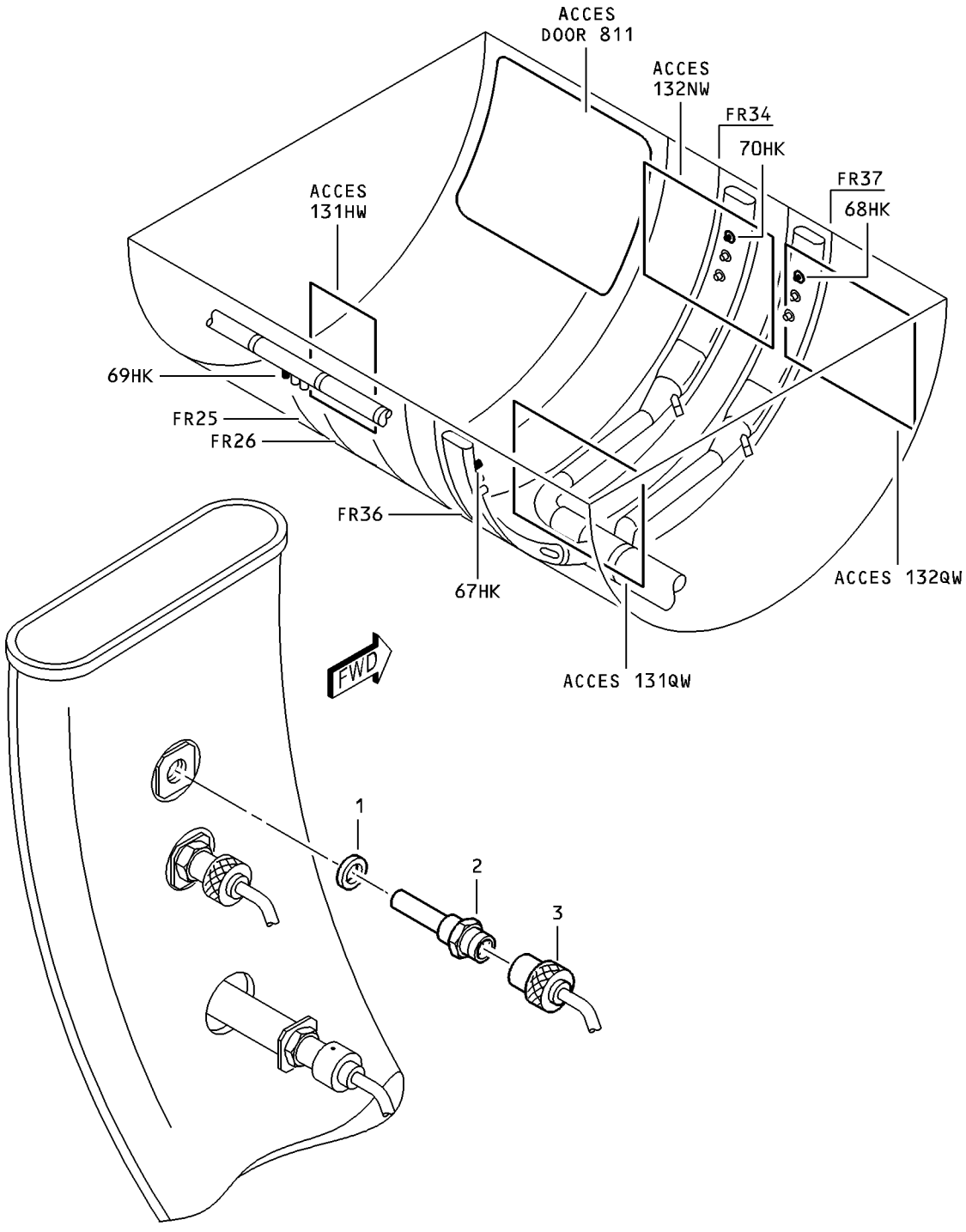


Ambient Temperature Sensor
Figure 301



BM6 21 63 00 3 AFM0 00

Zone Inlet Temperature Control Sensor
Figure 302



BM6 21 63 00 3 AJM0 00

Zone Duct Temperature Sensor
Figure 303

(2)COCKPIT (flight compartment) ambient temperature control sensor 33HK and ambient temperature sensor 65HK.
(a)Remove air inlet grille of sensor unit 459VU located in rear panel.
(3)Cabin ambient temperature control sensors 34HK, 35HK and 36HK and ambient temperature sensors 66HK, 62HK and 64HK.
(a)For forward cabin sensors 66HK and 34HK, remove ceiling panel at STA1499/FR21 and STA1552/FR22 (Ref. 25-23-11, P. Block 401).
(b)For mid cabin sensors 62HK and 35HK, remove ceiling panel at STA2665/FR49 and STA2718/FR50 (Ref. 25-23-11, P. Block 401).
(c)For aft cabin sensors 64HK and 36HK, remove ceiling panel at STA3620/FR67 and STA3673/FR68 (Ref. 25-23-11, P. Block 401).
R (4)Zone inlet temperature control sensors 29HK, 30HK, 31HK, 32HK and
R zone duct temperature sensors 67HK, 68HK, 69HK, 70HK.
R (a)Get access through door 811.
R (b)For zone inlet temperature control sensors 29HK, 30HK, 31HK, 32HK, remove panels 131HW, 132NW, 131QW and 132QW
R (c)For zone duct temperature sensors 67HK, 68HK, 69HK and 70HK, remove panels 131QW, 132QW, 131HW and 132NW (Ref. 25-54-10, P. Block 201).

B. Removal
(1)For cabin sensors 34HK (35HK) (36HK) and 66 HK (62HK) (64HK), remove bolts (4), washers (5) and cover (6) from sensor housing (7).
(2)Disconnect electrical connector (1) 34HK-A (35HK-A) (36HK-A), (19) 33HK-A, (16) 66HK-A (62HK-A) (64HK-A) and (20) 65HK-A.
(3)Cut and remove lockwire, remove sensor (2) 34HK (35HK), (36HK), sensor (18) 33HK, sensor (15) 66HK, (62HK) (64HK) and sensor (21) 65HK. Remove and discard O-rings (3), (17), (14) and (22).
(4)Cap sensor mounting base and electrical connectors (1), (19), (16) and (20).
(5)Remove clamps (9), (10) and (12).
(6)Disconnect hose (8) from sensor housing (7).
(7)Disconnect hose (11) from sensor housing (7) and from inlet grid (13).

WARNING : USE EXTREME CARE WHEN WORKING WITH CLEANING AGENT No. 11-002. THE SOLVENT VAPORS ARE TOXIC AND FLAMMABLE. MAKE CERTAIN THAT WORKING AREA IS WELL VENTILATED. DO NOT INHALE FUMES, MIST OR DUST. PROTECT EYES AND SKIN. APPLY ONLY IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS. FIRE PROTECTION REGULATIONS MUST BE OBSERVED.

C. Cleaning
(1)Clean inlet grid (13).
(2)Blow compressed air in hose (8) and clean with duster and brush as far as possible.
(3)Blow compressed air in hose (11) from sensor housing (7) in direction of inlet grid (13) and clean with vacuum cleaner and brush as far as possible.
(4)Clean sensor housing (7).
(5)Clean sensor (2) 34HK (35HK), (36HK), sensor (18) 33HK, sensor (15) 66HK

(62HK), (64HK) and sensor (21) 65HK with a cleaning solvent (Ref. Mat. No. 11-002) moistened lint free cloth.
(6)Do a visual inspection of the area behind the ceiling panels for contamination.

D. Installation
(1)Remove blanking plugs/caps and check for correct condition of sensor mounting base and electrical connectors.
(2)Clean and inspect sensor interface and/or adjacent area.
(3)Install new O-rings (3), (17), (14) and (22).
(4)Install sensors (2), (18), (15) and (21) on housing (7) and tighten ; TORQUE to between 0.30 and 1.35 m.daN (27 and 120 lbf.in) for flight compartment sensors 33HK and 65HK or to between 0.30 and 0.95 m.daN (27 and 84 lbf.in.) for cabin sensors 34HK (35HK), (36HK) and 66HK (62HK), (64HK), and wirelock.
(5)Connect electrical connectors (1) to sensor (2), (19) to sensor (18), (16) to sensor (15) and (20) to sensor (21).
(6)For cabin sensors 34HK (35HK), (36HK) and 66HK (62HK), (64HK), install covers (6), washers (5), bolts (4) on sensor housing (7). Tighten bolts (4).
(7)Connect hose (8) to sensor housing (7).
(8)Connect hose (11) to sensor housing (7) and inlet grid (13).
(9)Install clamps (9), (10) and (12).
(10)Remove safety clips and tags and close circuit breakers 3HK, 4HK, 6HK, 7HK, 54HK, 10HU and 11HU.

B. Removal
(1)For zone inlet temperature sensors 29HK, 30HK, 31HK, 32HK, and zone duct temperature sensors 67HK, 68HK, 69HK, and 70HK, disconnect electrical connector (3).
(2)Remove and discard lockwire, remove sensor (2).
(3)Remove and discard O-ring (1).
(4)Blank sensor mounting base and electrical connector (3).

C. Cleaning
WARNING : USE EXTREME CARE WHEN WORKING WITH CLEANING AGENT No. 11-002. THE SOLVENT VAPORS ARE TOXIC AND FLAMMABLE. MAKE CERTAIN THAT WORKING AREA IS WELL VENTILATED. DO NOT INHALE FUMES, MIST OR DUST. PROTECT EYES AND SKIN. APPLY ONLY IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS. FIRE PROTECTION REGULATIONS MUST BE OBSERVED.

(1)Clean sensor (2).
(2)Do a visual inspection of the sensor and electrical connector for contamination and damage.

D. Installation
(1)Remove blank and check for correct condition of sensor mounting base
(2)Install new O-ring (1) on sensor (2).
(3)Install sensor (2) and tighten.

(4)TORQUE sensor to between 0.30 and 0.95 m.daN (27 and 84 lbf.in). and secure with lockwire.
(5)Remove blank and connect electrical connector (1).

E. Test
(1)Remove safety clips and tags and close circuit breakers 3HK, 4HK, 6HK, 7HK, 54HK, 10HU and 11HU.
(2)Carry out operational tests (Ref. 21-63-16, P. Block 401, 21-63-17, P. Block 401), (Ref. 21-63-18, P. Block 401 and 21-63-19, P. Block 401).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Install air inlet grille for flight compartment sensor or ceiling panel for cabin sensors (Ref. 25-23-11, P. Block 401).
(3)FWD cargo compartment, reinstall panels removed for access: (Ref. 25-54-10, P. Block 201).
(4)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(5)Restore system and aircraft to normal operating condition.
(6)Remove warning notices.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
BEFORE PROCEEDING MAINTENANCE WORK ON AIR CONDITIONING SYSTEM MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Operational Test

A. Reason for the Job
To check for correct operation of :
- manual temperature control system
- automatic temperature control system.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform
(2)	Warning Notices
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure
(1)Job set-up
(a)Overhead panel circuit breakers closed, particularly those associated with COMPT TEMP and ECAM
(b)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Make certain that electronics racks ventilation is correct.
(d)Display warning notices prohibiting pressurization of pneumatic system.
(e)On COMPT TEMP panel 437VU
- place COCKPIT (AFT CABIN) (MID CABIN) (FWD CABIN) temperature selector in AUTO POSITION
- place COMPT/DUCT temperature selector switch in COCKPIT (CABIN/AFT) (CABIN/MID) (CABIN/FWD) position.
- make certain that PACK VALVE 1 and PACK VALVE 2 pushbutton switches are pressed (in) (FAULT legends on).

(f)On ECAM control panel (center pedestal)
- using RIGHT DISPLAY knob, adjust brightness of right ECAM display unit
- press COND pushbutton switch
. light on COND pushbutton switch should come on
. on right ECAM display unit, AIR COND page is displayed.

(2)Test
(a)Manual temperature control test

ACTION	RESULT
1. On AIR COND page (right ECAM display unit), if COCKPIT (CABIN) trim air	

ACTION	RESULT
valve position arrow does not indicate C On COMPT TEMP panel 437VU - Hold COCKPIT (AFT CABIN) (FWD CABIN) (MID CABIN) temperature selector in MAN COLD position unti COCKPIT (CABIN) trim air valve position arrow indicates C on AIR COND page	- COCKPIT trim air valve 25HK (FWD CABIN 26HK) (MID CABIN 27HK) (AFT CABIN 28HK) closes.
2. Hold COCKPIT (AFT CABIN) (MID CABIN) (FWD CABIN) temperature selector in MAN HOT position until COCKPIT (CABIN) trim air valve position arrow indicates H on AIR COND page	- COCKPIT trim air valve 25 HK (FWD CABIN 26HK) (MID CABIN 27HK) (AFT CABIN 28HK) opens.
3. Hold COCKPIT (AFT CABIN) (MID CABIN) (FWD CABIN) temperature selector in MAN COLD position until COCKPIT (CABIN) trim air valve position arrow indicates C on AIR COND page	- COCKPIT trim air valve 25 HK (FWD CABIN 26HK) (MID CABIN 27HK) (AFT CABIN 28HK) closes.
4. Place COCKPIT (AFT CABIN) (MID CABIN) (FWD CABIN) temperature selector in AUTO position. NOTE : Opening and closing time of trim air valve : 20 ± 4 seconds.	None.

(b)Automatic temperature control test.
NOTE : Test instructions are given on the face of the APU and pack temperature demand controller 37HK.

ACTION	RESULT
1. On APU and pack temperature demand controller 37HK: - check that electrical power is available at APU and pack temp demand controller by pressing BITE READY/UNPLUG CABLE AFTER USE light. - make certain that BITE SWITCH is in position 1.	On APU and pack temperature demand controller 37HK: - light comes on when pressed.
2. On circuit breaker panel 131VU: - at location F54 open circuit breaker 4HK. - at location F58 open	

ACTION	RESULT
circuit breaker 7HK.	
3. On COCKPIT temperature controller 17HK (FWD CABIN 18HK) (MID CABIN 19HK) (AFT CABIN 20HK): - remove protective cap from controller BITE connector. - disconnect BITE cable from APU and pack temperature demand controller 37HK dummy connector 103VC and connect to controller BITE connector.	
4. On circuit breaker panel 131VU: - at location F54 close circuit breaker4HK. - at location F58 close circuit breaker 7HK.	On APU and pack temperature demand controller 37HK: - BITE READY/UNPLUG CABLE AFTER USE and GO indicator lights come on.
5. On APU and pack temperature demand controller 37HK: - press NO GO light.	- red NO GO light comes on.
6. On APU and pack temperature demand controller 37HK: - successively place BITE SWITCH in positions 1 to 12.	In each position - green GO light comes on. - red NO GO light remains off.
At each position wait for NO GO or GO indicator light to come on.	Positions 1 to 3 - APU and pack temperature demand controller test. Positions 4 to 9 - zone (under test) temperature controller test. Position 10 - zone inlet temperature sensor test. Position 11 - zone temperature control sensor test. Position 12 - temperature selector test.
7. On COMPT TEMP panel 437VU: - place COCKPIT (AFT CAB) (MID CAB) (FWD CAB) temperature selector in MAN position.	On APU and pack temperature demand controller 37HK: - GO light goes off. - BITE READY/UNPLUG CABLE AFTER USE light goes off.
- place COCKPIT (AFT CAB) (MID CAB)	On APU and pack temperature demand

ACTION	RESULT
(FWD CAB) temperature selector in AUTO position.	controller 37HK: - GO light comes on. - BITE READY/UNPLUG CABLE AFTER USE light comes on.
- release PACK VALVE 1 pushbutton switch.	On APU and pack temperature demand controller 37HK: - GO light remains on. - BITE READY/UNPLUG CABLE AFTER USE light remains on.
- release PACK VALVE 2 pushbutton switch	On APU and pack temperature demand controller 37HK: - GO light goes off. - BITE READY/UNPLUG CABLE AFTER USE light goes off.
- press PACK VALVE 1 and PACK VALVE 2 pushbutton switches.	On APU and pack temperature demand controller 37HK: - GO light comes on. - BITE READY/UNPLUG CABLE AFTER USE light comes on.

8. On circuit breaker panel 131VU:
   - at location F54 open circuit breaker 4HK.
   - at location F58 open circuit breaker 7HK.

9. On COCKPIT temperature controller 17HK (FWD CABIN 18HK) (MID CABIN 19HK) (AFT CABIN 20HK):
   - disconnect BITE cable from controller and secure to APU and pack temperature demand controller 37HK dummy connector 103VC.
   - secure protective cap to controller BITE connector.

R
R
R

(3)Close-up

R (a)Close circuit breakers 4HK and 7HK.

(b)On APU and pack temperature demand controller 37HK
- place BITE switch in position 1.

(c)On COMPT TEMP panel 437VU

- release PACK VALVE 1 and PACK VALVE 2 pushbutton switches.

(d)Remove warning notices.

(e)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(f)Restore system and aircraft to normal operating condition.

ZONE TEMPERATURE CONTROLLER 19HK, (17HK) (18HK) (20HK) - REMOVAL INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking Plugs/Caps
Referenced Procedure - 21-63-00, P. Block 501	Flight Compartment and Cabin Temperature Control

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP/COCKPIT & MID CABIN/AUTO CTL	4HK	313/F54
131VU	COMPT TEMP/COCKPIT & MID CABIN/MAN CTL	3HK	313/F53
131VU	COMPT TEMP/FWD & AFT CABIN/AUTO CTL	7HK	313/F58
131VU	COMPT TEMP/FWD & AFT CABIN/MAN CTL	6HK	313/F52

B. Removal

(1))Open access door 121BL
(2)Disconnect electrical connector (2).
(3)Remove screws (5) and washers (4).
(4)Slightly lift front of controller (1) and free from rear attachment flange (6).
(5)Remove controller (1).
(6)Cap electrical connector (2).

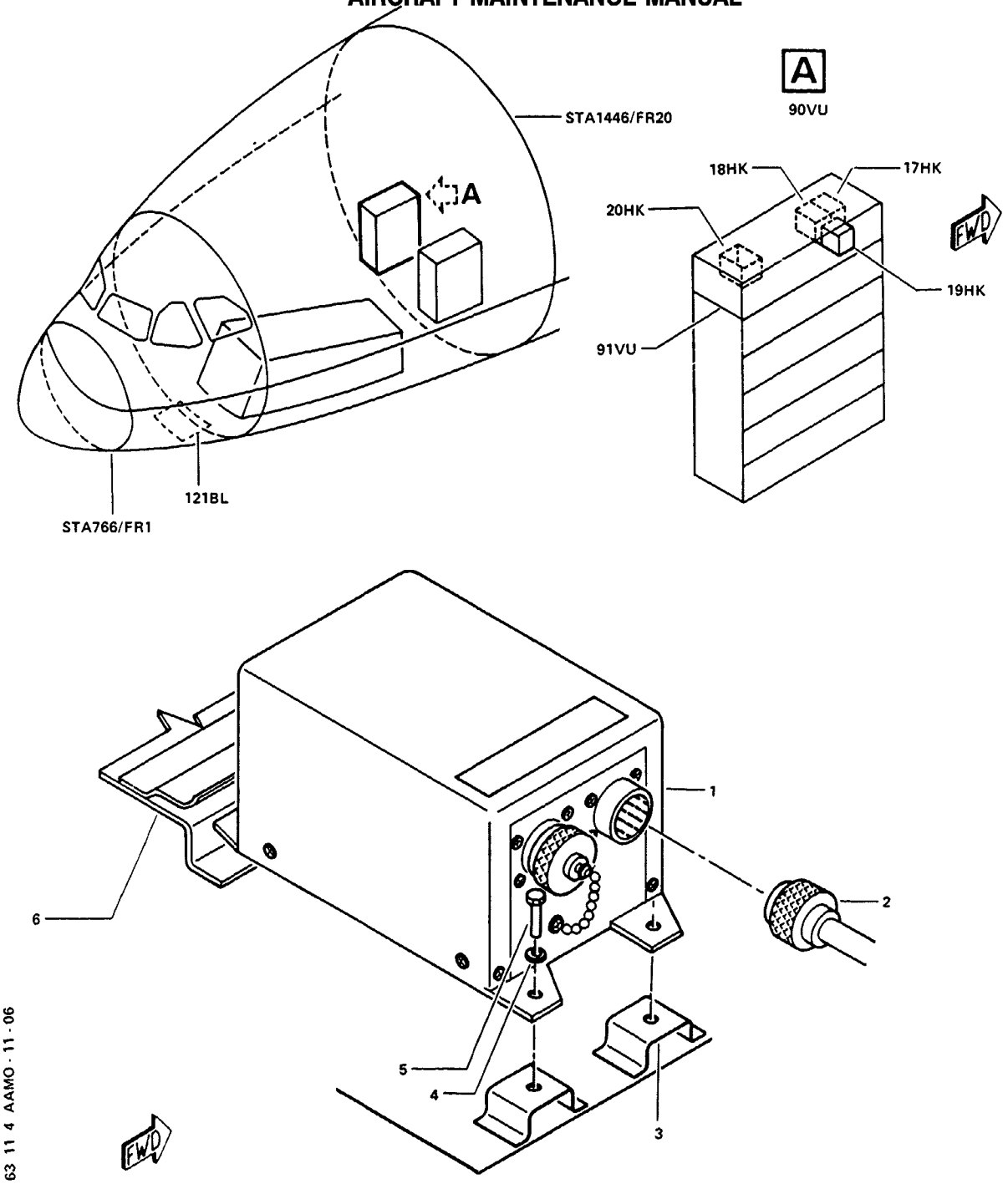
C. Installation

(1)Clean and inspect controller interface and/or adjacent area.
(2)Remove blanking plug/cap and check for correct condition of electrical connector.
(3)Position controller (1) on its support (3).
(4)Insert controller rear attachment lugs in attachment flange (6).
(5)Install washers (4) ; install and tighten screws (5).
(6)Connect electrical connector.
(7)Remove safety clips and tags and close circuit breakers 4HK, 3HK, 7HK and 6HK.

D. Test

Carry out an operational test of flight compartment and cabin temperature control (Ref. 21-63-00, P. Block 501, para. 2. (b) automatic temperature control test).

E. Close-Up



Zone Temperature Controller
Figure 401

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 121BL.

TRIM AIR VALVE - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. COCKPIT Trim Air Valve 25HK

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2 m (6 ft. 7 in.)
(2)	Torque Wrench 0.5 m.daN (45 lbf.in.)
(3)	Blanking Plugs/Caps
(4)	Circuit Breaker Safety Clips
(5)	Warning Notices
Referenced Procedure - 21-63-00, P. Block 501	Flight Compartment and Cabin Temperature Control

B. Procedure

(Ref. Fig. 401)

(1)Job Set-Up

(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP/COCKPIT & MID CABIN/AUTO CTL	4HK	313/F54
131VU	COMPT TEMP/COCKPIT & MID CABIN/MAN CTL	3HK	313/F53
R 21VU	SDAC/26VAC/ESS	5WV	109/A4

(b)Position access platform.

(c)Display warning notices prohibiting any operation of the system.

(d)Open access door 136AR.

(2)Removal

(a)Disconnect electrical connectors (2) and (5).

(b)Remove clamp (3).

(c)Hold valve and remove clamp (7).

(d)Remove valve (1).

(e)Cap open duct ends (4) and (6), and electrical connectors (2) and (5).

(3)Installation

(a)Remove blanking plugs/caps and check for correct condition of duct flanges and electrical connectors.

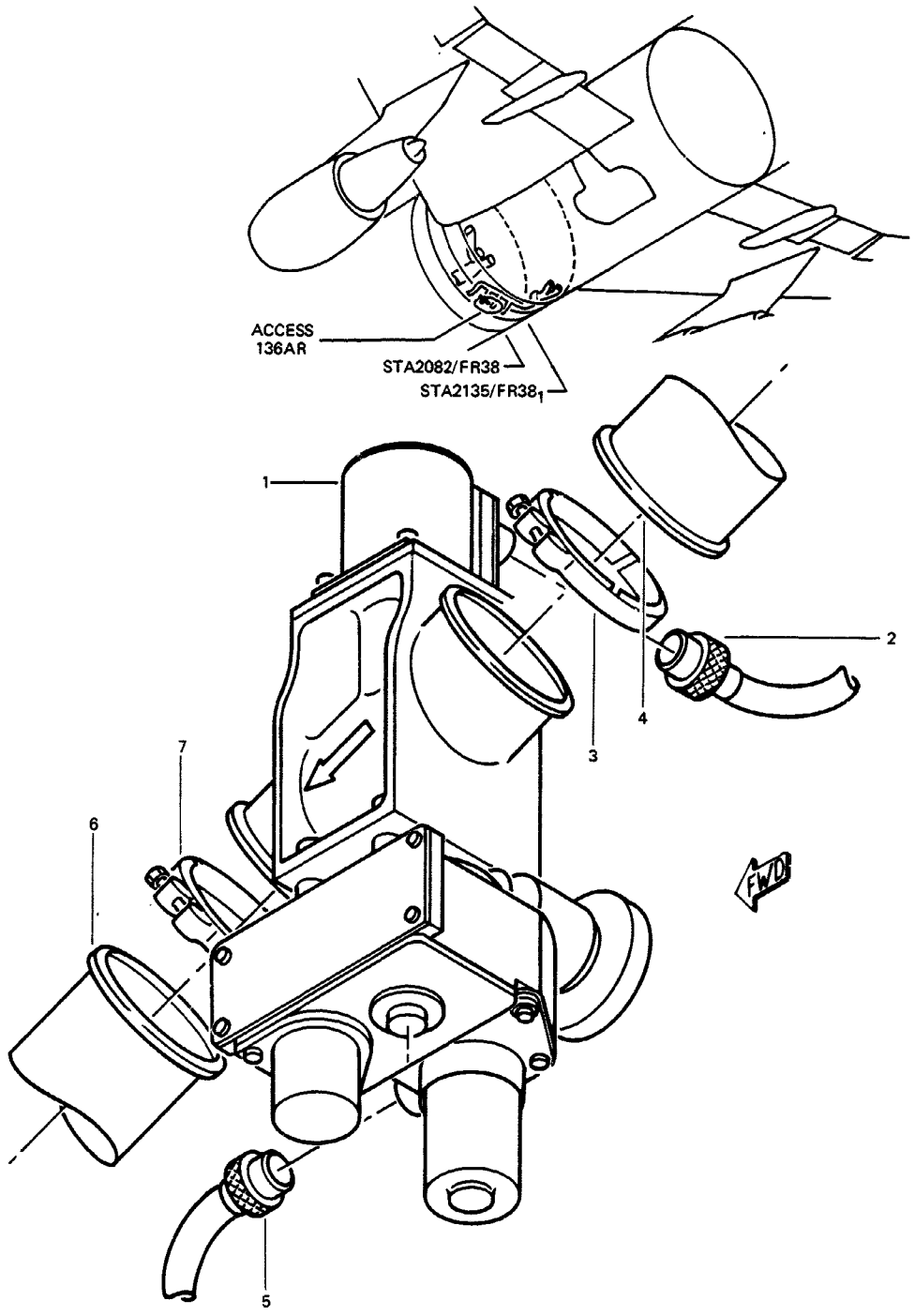
(b)Clean and inspect valve interface and/or adjacent area.

(c)Install valve (1) between ducts (4) and (6) with arrow indicating air-flow direction pointing forwards and actuator and motor directed downwards.

(d)Install clamps (3) and (7) and tighten nuts ; TORQUE to the value given on clamps.

(e)Connect electrical connectors (2) and (5).

R (f)Remove safety clips and tags and close circuit breakers 4HK, 3HK and
R 5WV.



COCKPIT Trim Air Valve
Figure 401

(4)Test
  (a)Carry out on operational test of flight compartment and cabin temperature control (Ref. 21-63-00, P. Block 501, para. (2) (a), manual temperature control test).
(5)Close-up
  (a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
  (b)Close access door 136AR.
  (c)Remove access platform.
  (d)Remove warning notices.

2. Cabin Trim Air Valve 26HK, (27HK), (28HK)

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2 m (6 ft. 7 in.)
(2)	Torque Wrench 0.5 m.daN (45 lbf.in.)
(3)	Blanking Plugs/Caps
(4)	Circuit Breaker Safety Clips
(5)	Warning Notices
Referenced Procedure - 21-63-00, P. Block 501	Flight Compartment and Cabin Temperature Control

B. Procedure

(Ref. Fig. 402)

(1)Job set-up

(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP/COCKPIT & MID CABIN/AUTO CTL	4HK	313/F54
131VU	COMPT TEMP/COCKPIT & MID CABIN/MAN CTL	3HK	313/F53
131VU	COMPT TEMP/FWD & AFT CABIN/AUTO CTL	7HK	313/F58
131VU	COMPT TEMP/FWD & AFT CABIN/MAN CTL	6HK	313/F52
R 21VU	SDAC/26VAC/ESS	5WV	109/A4

(b)Position access platform.

(c)Display warning notices prohibiting any operation of the system.

(d)Open access door 136AR.

(2)Removal

(a)Disconnect electrical connectors (1) and (5).

(b)Remove clamp (3).

(c)Hold valve and remove clamp (7).

(d)Remove valve (2).

(e)Cap open duct ends (4) and (6) and electrical connectors (1) and (5).

(3)Installation

(a)Remove blanking plugs/caps and check for correct condition of duct flanges and electrical connectors.

(b)Clean and inspect valve interface and/or adjacent area.

(c)Install valve (2) between ducts (4) and (6) with arrow indicating air-flow direction pointing forwards and actuator and motor directed downwards.

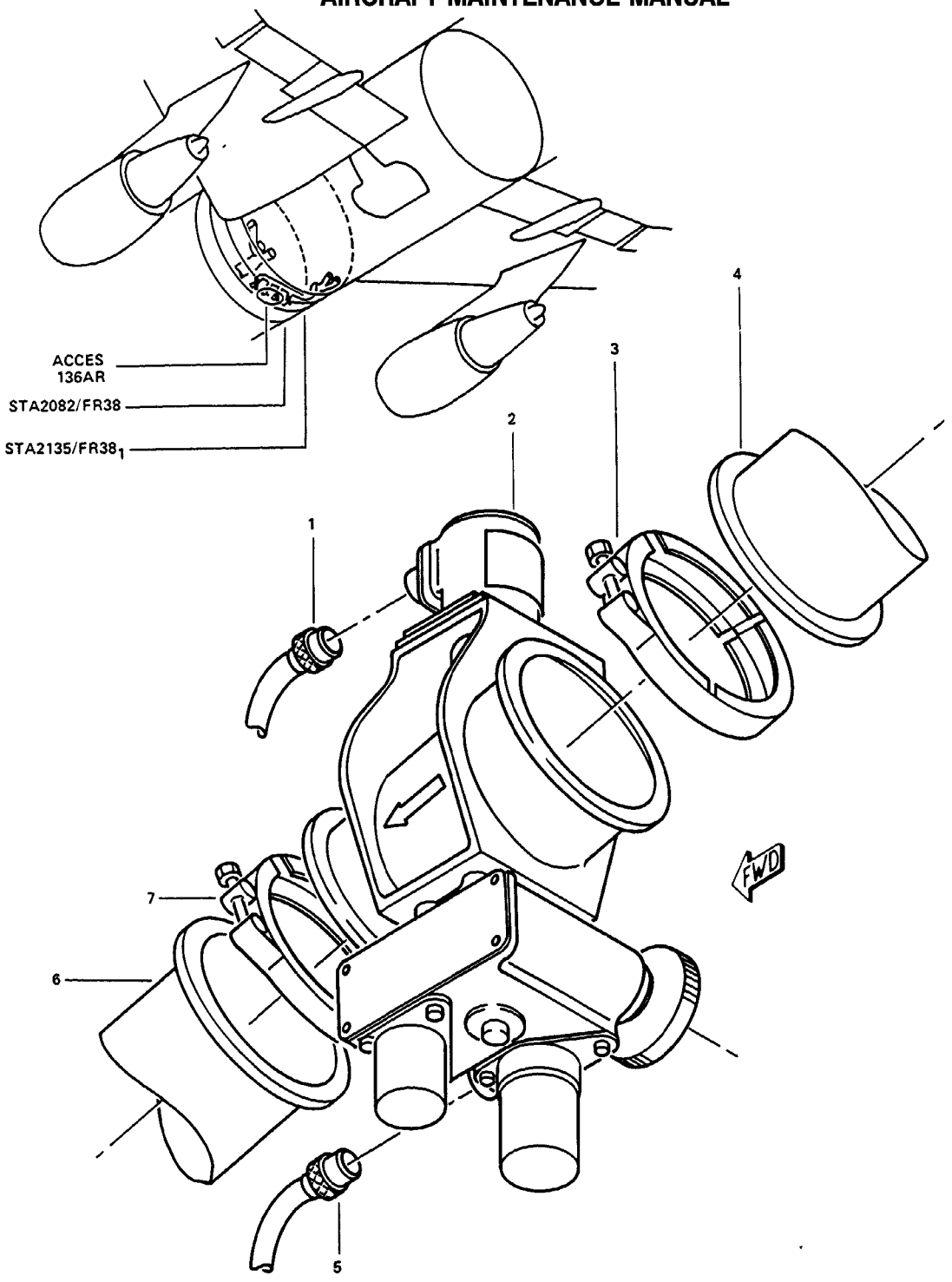
(d)Install clamps (3) and (7) and tighten nuts ; TORQUE to the value given on clamps.

(e)Connect electrical connectors (1) and (5).

(f)Remove safety clips and tags and close circuit breakers 4HK, 3HK,
R 7HK, 6HK and 5WV.

(4)Test

(a)Carry out an operational test of flight compartment and cabin tempe-



Cabin Trim Air Valve
Figure 402

rature control (Ref. 21-63-00, P. Block 501, para. (2) (a), manual temperature control test).

(5)Close-up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Close access door 136AR.

(c)Remove access platform.

(d)Remove warning notices.

TRIM AIR VALVE - DEACTIVATION/REACTIVATION

Ref. : MEL Sect. 1-21, item 15 (Temperature control valves (cockpit + cabin))
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.
- IDENTIFY THE FAILED TRIM AIR VALVE (TROUBLE SHOOTING).

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

NOTE : The deactivation and reactivation procedures are identical for flight compartment (COCKPIT) 25HK (FWD CABIN 26HK) (MID CABIN 27HK) (AFT CABIN 28HK) trim air valves.

1. Deactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.00 m (6 ft. 7 in.)
(2)	Blanking Plugs/Caps
(3)	Circuit Breaker Safety Clips
(4)	Warning Notice
(5)	Tape

B. Procedure

(Ref. Fig. 901, 902)

(1)Job set-up

(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP/COCKPIT &/MID CABIN/MAN/CTL	3HK	313/F53
131VU	COMPT TEMP/COCKPIT &/MID CABIN/AUTO/CTL	4HK	313/F54
131VU	COMPT TEMP/FWD & AFT/CABIN/MAN/CTL	6HK	313/F52
131VU	COMPT TEMP/FWD & AFT/CABIN/AUTO/CTL	7HK	313/F58

(b)On COMPT TEMP Panel 437VU
- make certain that PACK VALVE 1 and 2 pushbutton switches are released (out) (pack flow control valves closed).
- display a warning notice prohibiting any operation of the system.

(c)Position access platform.

(d)Open access door 136AR.

(2)Removal

(a)Disconnect electrical connectors (1) 25HK-A, (26HK-A), (27HK-A), (28HK-A) and (2) 25HK-B), (26HK-B), (27HK-B), (28HK-B).

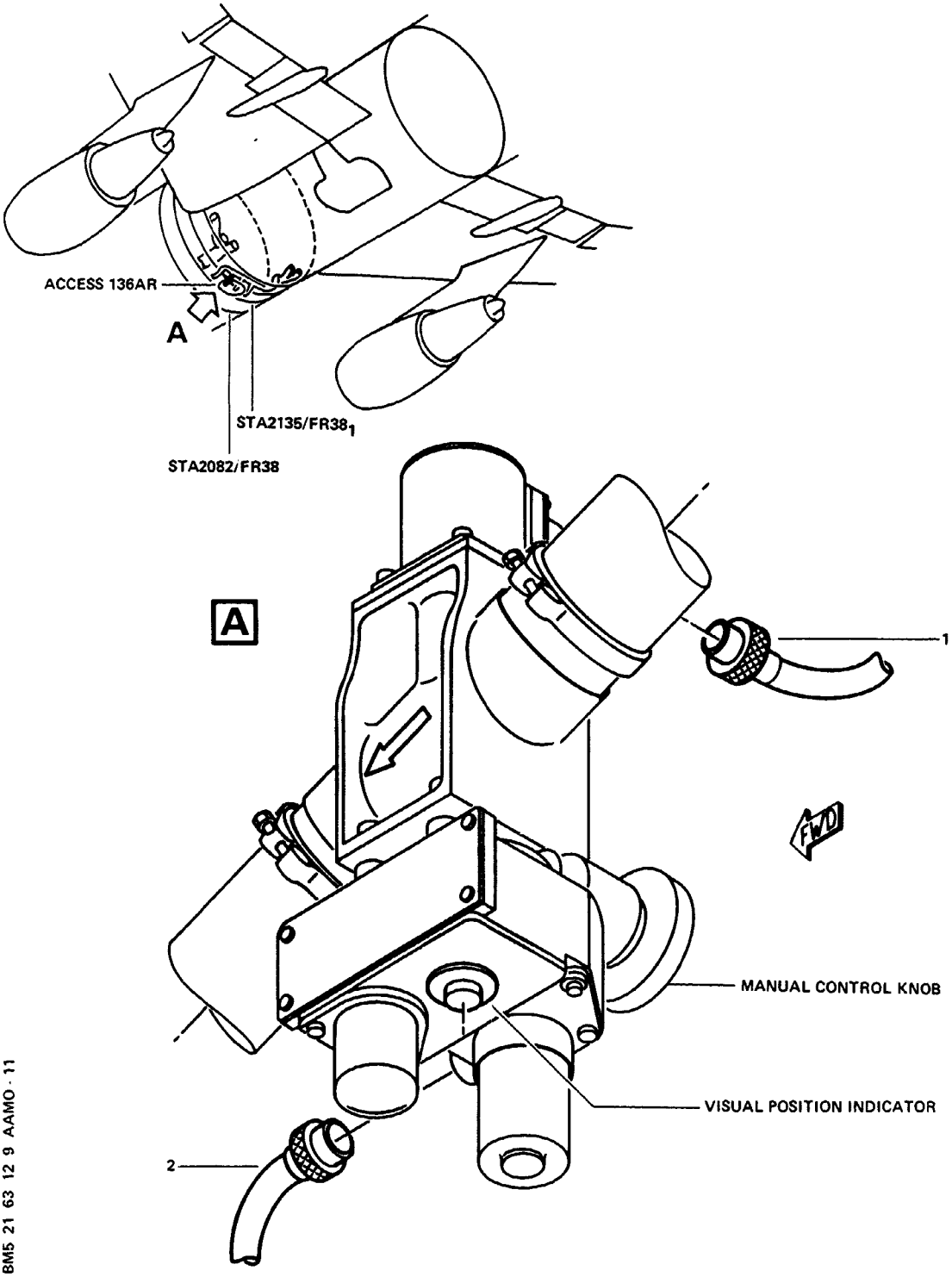
(b)Cap electrical connectors.

(c)Stow the disconnected electrical connectors and secure with tape.

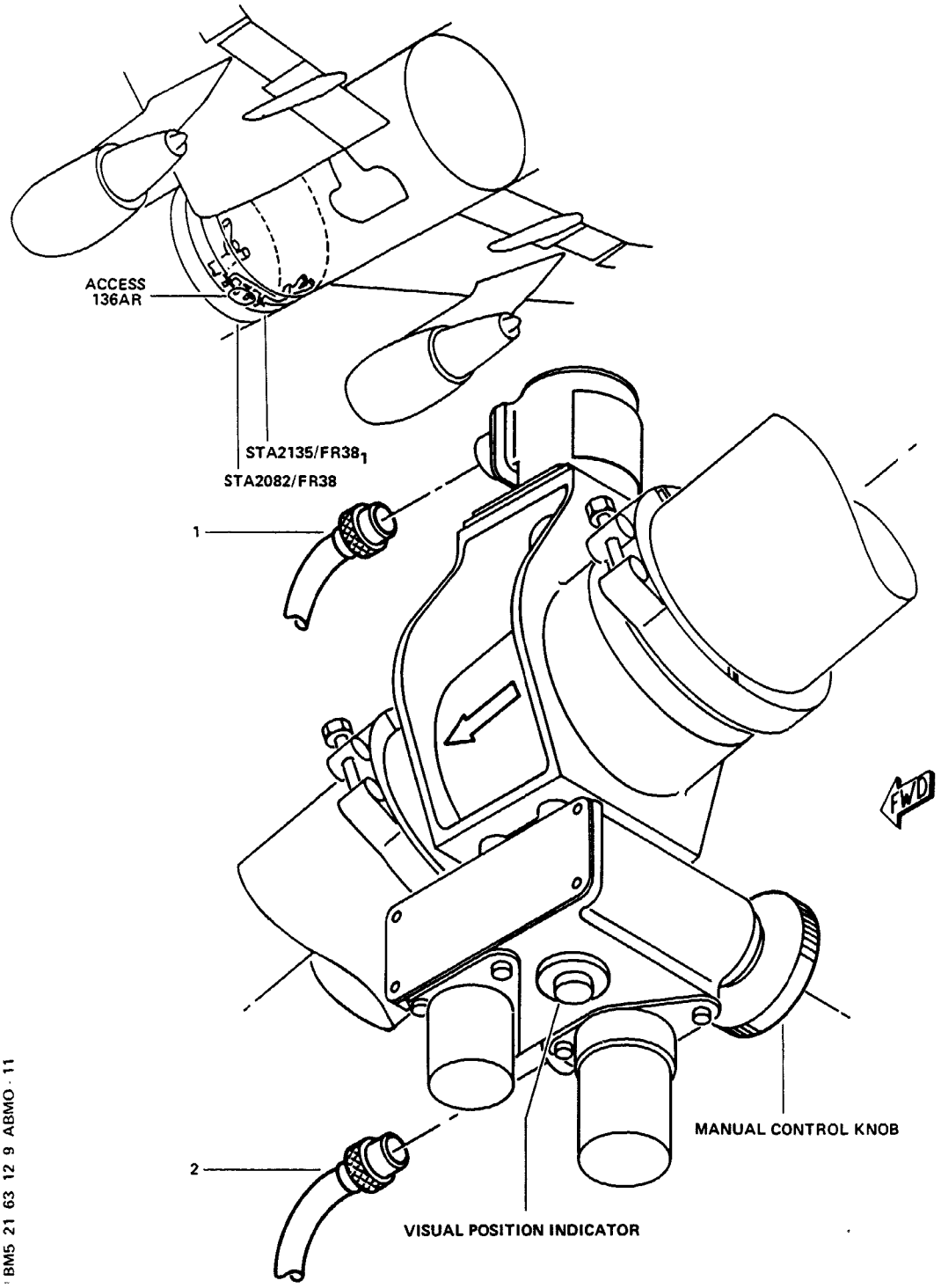
(d)Move valve 25HK, (26HK), (27HK), (28HK) to fully CLOSED position by means of manual drive.

(3)Close-Up

R (a)Remove safety clips and tags and close all circuit breakers : 3HK,



Flight Compartment (COCKPIT) Trim Air Valve
Figure 901



Cabin Trim Air Valve
Figure 902

R 4HK, 6HK and 7HK.
(b)On COMPT TEMP panel 437VU
- place COCKPIT (FWD CABIN) (MID CABIN) (AFT CABIN) temperature selector in AUTO position.
(c)Remove warning notice.
(d)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(e)Close access door 136AR.
(f)Remove access platform.
(g)Install a temporary placard in the flight compartment to warn the flight crew that trim air valve 25HK (26HK) (27HK) (28HK) is deactivated.
(h)Make an entry in the aircraft technical log.

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.00 m (6 ft. 7 in.)

B. Procedure (Ref. Fig. 901, 902)
(1)Job set-up
(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP/COCKPIT &/MID CABIN/MAN/CTL	3HK	313/F53
131VU	COMPT TEMP/COCKPIT &/MID CABIN/AUTO/CTL	4HK	313/F54
131VU	COMPT TEMP/FWD & AFT/CABIN/MAN/CTL	6HK	313/F52
131VU	COMPT TEMP/FWD & AFT/CABIN/AUTO/CTL	7HK	313/F58

(b)On COMPT TEMP panel 437VU
- make certain that PACK VALVE 1 and 2 pushbutton switches are released (out) (pack flow control valves closed).
(c)Position access platform.
(d)Open access door 136AR.
(2)Installation
(a)Return manual drive of valve 25HK, (26HK), (27HK), (28HK) to normal operation position.
(b)Remove blanking plugs/caps from electrical plugs and receptacles.
(c)Connect electrical connectors 25HK-A (1) and 25HK-B (2) (26HK-A and 26HK-B), (27HK-A and 27HK-B), (28HK-A and 28HK-B).
(d)Remove safety clips and tags and close circuit breakers 3HK, 4HK, 6HK and 7HK.
(e)Troubleshoot the system (Ref. TSM21-63-00).
(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Close access door 136AR.

(c)Remove access platform.
(d)Remove warning notice and temporary placard.
(e)Clear technical log.

ZONE INLET TEMPERATURE CONTROL SENSOR 29HK (30HK, 31HK, 32HK) REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR CONDITIONING SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.70 m (8ft. 6 in.)
B.	Torque Wrench 0.95 m. daN (84 lbf. in.)
C.	Blanking Plugs/Caps
D.	O-Rings
E.	Circuit Breaker Safety Clips
F.	Lockwire
G.	Warning Notices
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP/COCKPIT & MID CABIN/AUTO CTL	4HK	313/F54
131VU	COMPT TEMP/COCKPIT & AFT CABIN/AUTO CTL	7HK	313/F58

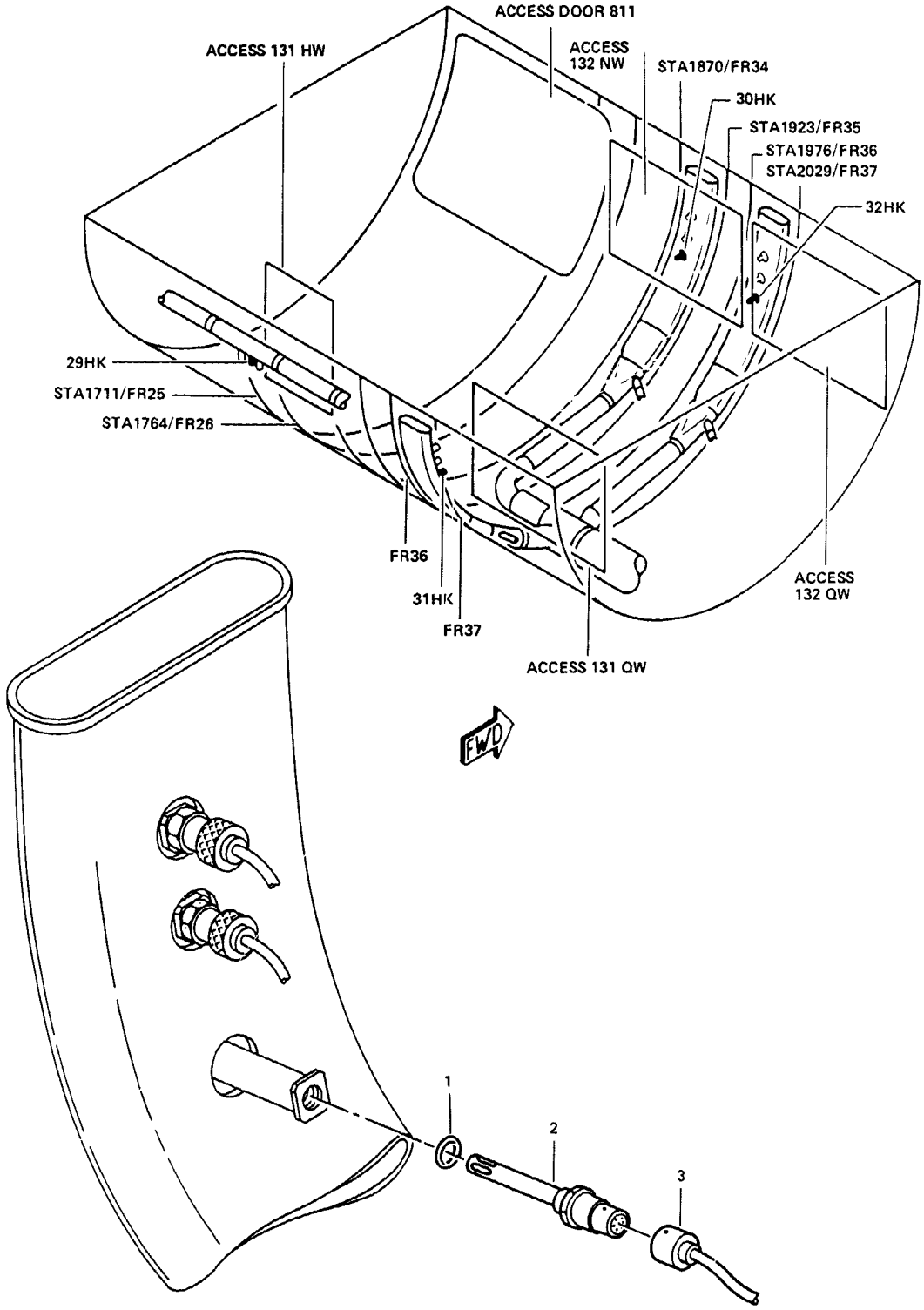
(2)Display warning notices prohibiting pressurization of pneumatic system.
(3)Position access platform at access door 811.
(4)Remove following access doors :
(a)For sensor 29HK : 131HW
(b)For sensor 30HK : 132NW
(c)For sensor 31HK : 131QW
(d)For sensor 32HK : 132QW.

B. Removal

(1)Disconnect electrical connector (3).
(2)Cut and remove lockwire, remove sensor (2).
(3)Remove and discard O-ring (1).
(4)Blank off sensor (2) mounting base on duct and cap electrical connector (3).

C. Installation

(1)Remove blanking plugs/caps ; check for correct condition of sensor mounting base and electrical connector.
(2)Clean and inspect sensor interface and/or adjacent area.



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Zone Inlet Temperature Control Sensor
Figure 401

(3)Install new O-ring (1) on sensor (2).
(4)Install sensor on mounting base and tighten ; TORQUE to between 0.30 and 0.95 m.daN (27 and 84 lbf. in.).
(5)Wirelock
(6)Connect electrical connector (3).
(7)Remove safety clips and tags and close circuit breakers 4HK and 7HK.

D. Test
Initial conditions
- correct electrical power supply
- forward services ventilation system in operation
- overhead panel circuit breakers closed, particularly those associated with COMPT TEMP, AIR BLEED, AIR BLEED of COMPT TEMP.
- on COMPT TEMP panel 437VU, PACK VALVES 1 and 2 pushbutton switches are pressed (in).
- on COMPT TEMP panel 437VU
  . COCKPIT, (AFT CABIN), (MID CABIN), (FWD CABIN) temperature selector in AUTO position
  . COMPT/DUCT temperature selector switch in COCKPIT (CABIN/AFT) (CABIN FWD) (CABIN MID) position.
- avionics compartment access door 121BL open.

NOTE : Test instructions are given on the face of APU and pack temperature demand controller 37HK.

ACTION	RESULT
In avionics compartment, rack 90VU	
1. On COCKPIT temperature controller 17HK (forward cabin 18HK), (mid cabin 19HK), (aft cabin 20HK) - remove guard from BITE connector - connect BITE cable from APU and pack temperature demand controller 37HK.	On APU and pack temperature demand controller 37HK - BITE READY/UNPLUG CABLE AFTER USE indicator light comes on - GO indicator light comes on - NO GO indicator light remains off
2. On APU and pack temperature demand controller 37HK - press NO GO indicator light - place BITE selector switch in position 10	- NO GO indicator light comes on - GO indicator light comes on.

NOTE : Rotate BITE selector switch clockwise : at each position, wait for GO indicator light to come on.

E. Close-Up
(1)On APU and pack temperature demand controller 37HK
- place BITE selector switch in position 1.
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)De-energize the aircraft electrical network (Ref. 24-41-00,

P. Block 301).
(4)Restore system and aircraft to normal operating condition.
(5)Close access doors :
  (a)For sensor 29HK : 131HW
  (b)For sensor 30HK : 132NW
  (c)For sensor 31HK : 131QW
  (d)For sensor 32HK : 132QW.
(6)Close access door 811.
(7)Remove access platform.
(8)Remove warning notices.

AMBIENT TEMPERATURE CONTROL SENSOR 33HK (34HK) (35HK) (36HK) REMOVAL/INSTALLATION

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

NOTE : Removal/installation procedures are identical for COCKPIT (flight compartment) ambient temperature sensor 33HK, forward cabin 34HK, mid cabin 35HK and aft cabin 36HK.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Torque Wrench - 1.35 m.daN (1.20 lbf. in.)
B.	Blanking Plugs/Caps
C.	O-Ring
D.	Circuit Breaker Safety Clips
E.	Lockwire Dia. 0.8 mm (0.030 in.)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 25-23-11, P. Block 401	Ceiling Panels

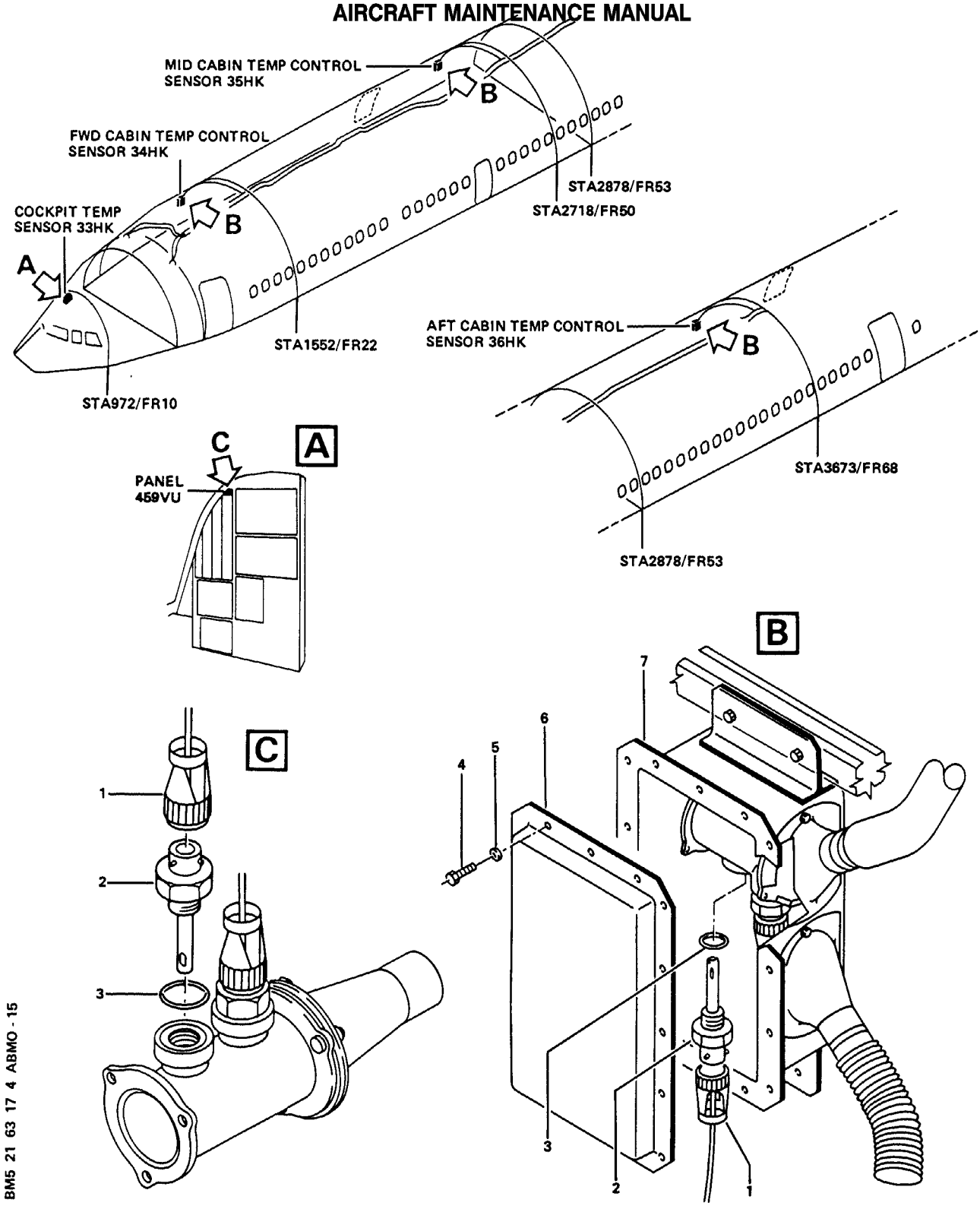
2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP/COCKPIT & MID CABIN/AUTO CTL	4HK	313/F54
131VU	COMPT TEMP/COCKPIT & MID CABIN/MAN CTL	3HK	313/F53
131VU	COMPT TEMP/FWD & AFT CABIN/AUTO CTL	7HK	313/F58
131VU	COMPT TEMP/FWD & AFT CABIN/MAN CTL	6HK	313/F52

(2)COCKPIT (flight compartment) ambient temperature control sensor 33HK.
(3)Cabin ambient temperature control sensors 34HK, 35HK and 36HK.
(a)For forward cabin ambient temperature control sensor 34HK, remove ceiling panel at STA1499/FR21 and STA1552/FR22 (Ref. 25-23-11, P. Block 401).
(b)For mid cabin ambient temperature control sensor 35HK, remove ceiling panel at STA2665/FR49 and STA2718/FR50 (Ref. 25-23-11, P. Block 401).
(c)For aft cabin ambient temperature control sensor 36HK, remove ceiling panel at STA3620/FR67 and STA3673/FR68 (Ref. 25-23-11, P. Block 401).

B. Removal
(1)For cabin sensor 34HK (35HK) (36HK) remove bolts (4), washers (5) and cover (6) from sensor housing (7).
(2)Disconnect electrical connector (1) 33HK-A, (34HK-A), (35HK-A), (36HK-A).



Ambient Temperature Control Sensor
Figure 401

(3)Cut and remove lockwire; remove sensor (2) 33HK, (34HK), (35HK), (36HK). Remove and discard O-ring (3).
(4)Cap sensor mounting base and electrical connector.

C. Installation
(1)Remove blanking plugs/caps and check for correct condition of sensor mounting base and electrical connector.
(2)Clean and inspect sensor interface and/or adjacent area.
(3)Install a new O-ring (3) on sensor (2).
(4)Install sensor (2) on housing and tighten ; TORQUE to between 0.30 and 1.35 m.daN (27 and 120 lbf. in.) for flight compartment sensor 33HK or to between 0.30 and 0.95 m.daN (27 and 84 lbf. in.) for cabin sensor 34HK (35HK), (36HK), and wirelock.
(5)Connect electrical connector (1) to sensor (2).
(6)For cabin sensor 34HK (35HK), (36HK), install cover (6), washers (5), bolts (4) on sensor housing (7). Tighten bolts (4).
(7)Remove safety clips and tags and close circuit breakers 3HK, 4HK, 6HK and 7HK.

D. Test
Initial conditions :
- Correct electrical power supply
- Forward services ventilation system in operation.
- Overhead and lateral panel circuit breakers closed, particularly those associated with COMPT TEMP, AIR BLEED, AIR BLEED & COMPT TEMP.
- On COMPT TEMP panel 437VU, PACK VALVE 1 and 2 pushbutton switches are pressed (in).
- On COMPT TEMP panel 437VU
  . COCKPIT (AFT CABIN), (MID CABIN), (FWD CABIN) temperature selector in AUTO position.
  . COMPT/DUCT temperature selector switch in COCKPIT (CABIN/AFT), (CABIN/MID), (CABIN/FWD) position.
- Avionics compartment access door 121BL or 132AZ open.

NOTE : Instructions for performing the test are given on the face of APU and pack temperature demand controller 37HK.

ACTION	RESULT
In avionics compartment, electronics rack 90VU.	
1. On COCKPIT temperature controller 17HK (forward cabin 18HK) (mid cabin 19HK) (aft cabin 20HK) - remove BITE connector guard - connect APU and pack temperature demand controller 37HK BITE cable.	On APU and pack temperature demand controller 37HK - BITE READY/UNPLUG CABLE AFTER USE indicator light comes on - GO indicator light comes on - NO GO warning light remains off.
2. On APU and pack temperature demand controller 37HK - press NO/GO warning light - place BITE selector switch in	 - NO GO warning light comes on - GO indicator light comes on.

ACTION	RESULT

position 11.

NOTE : Rotate BITE selector switch clockwise : at each position, wait for GO indicator light to come on.

E. Close-Up

(1) On APU and pack temperature demand controller 37HK
- place BITE selector switch in position 1.

(2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(3) Install air inlet grille for flight compartment sensor or ceiling panel for cabin sensors (Ref. 25-23-11, P. Block 401).

(4) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(5) Restore system and aircraft to normal operating condition.

ZONE DUCT TEMPERATURE SENSOR 67HK, (68HK), (69HK), (70HK) REMOVAL/INSTALLATION

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.70m (8ft. 6 in.)
B.	Torque Wrench 0.95m.daN (84 lbf.in)
C.	Blanking Plugs/Caps
D.	O-Rings
E.	Lockwire
F.	Circuit Breaker Safety Clips
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP/TEMP IND	54HK	311/H58

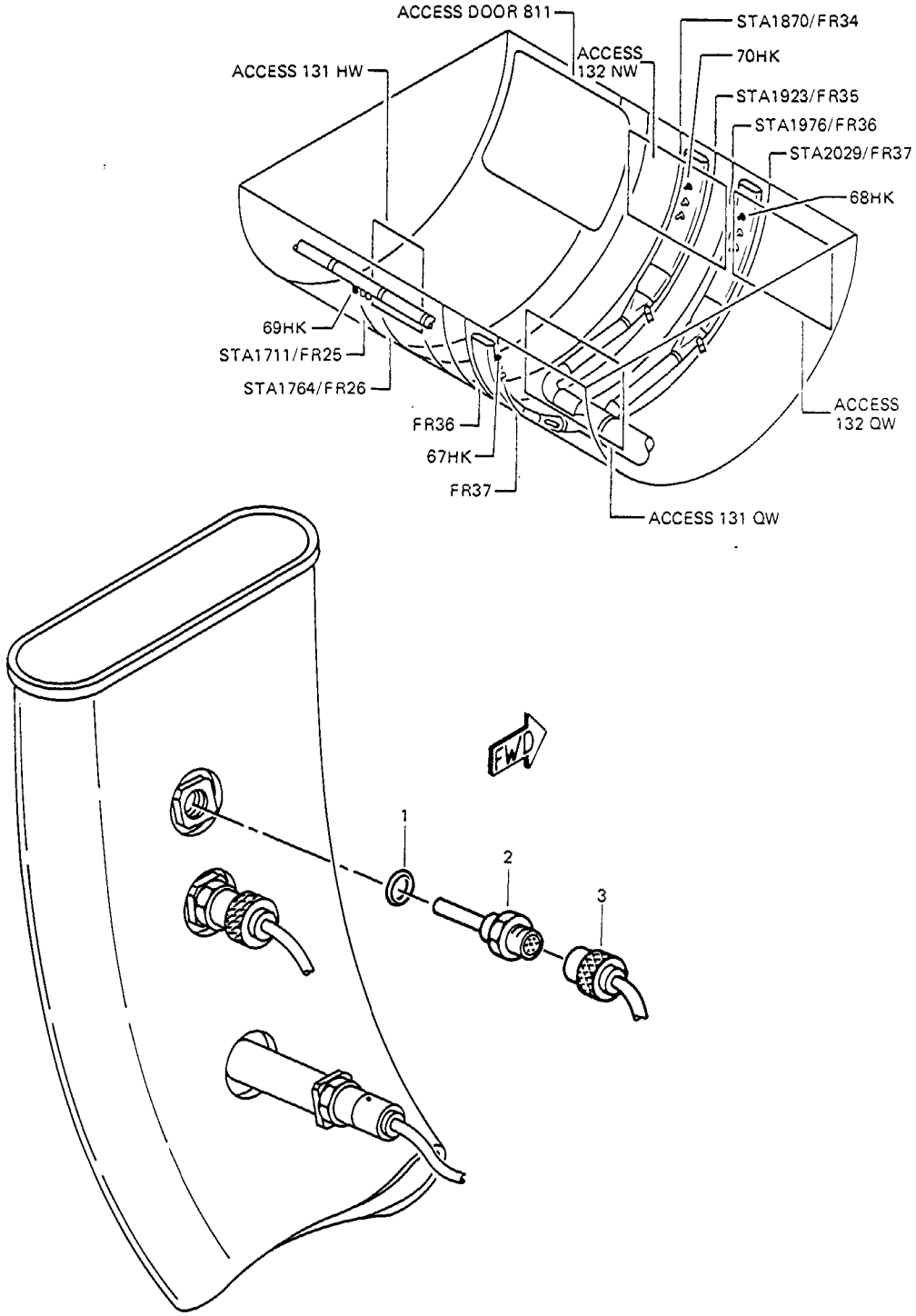
(2)Display warning notices prohibiting pressurization of pneumatic system.
(3)Position access platform at access door 811.
(4)Open access door 811.
(5)Remove the following access doors :
(a)for sensor 67HK : 131QW
(b)for sensor 68HK : 132QW
(c)for sensor 69HK : 131HW
(d)for sensor 70HK : 132NW.

B. Removal

(1)Disconnect electrical connector (3).
(2)Cut and remove lockwire ; remove sensor (2).
(3)Remove and discard O-ring (1).
(4)Blank off sensor mounting base on duct and electrical connector (3).

C. Installation

(1)Remove blanking plugs/caps and check for correct condition of sensor mounting base on duct and electrical connector.
(2)Clean and inspect sensor interface and/or adjacent area.
(3)Install new O-ring (1) on sensor (2).
(4)Install sensor (2) on mounting base and tighten ; TORQUE to between 0.30 and 0.95m.daN (27 and 84 lbf.in.).



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Zone Duct Temperature Sensor
Figure 401

(5)Wirelock.
(6)Connect electrical connector (3).
(7)Remove safety clip and tag and close circuit breaker 54HK.

D. Test
(1)Initial conditions
- overhead panel circuit breakers closed, particularly those associated with COMPT TEMP and ECAM.
- correct electrical power supply.
- forward services ventilation system in operation.

(2)On COMPT TEMP panel 437 VU
- place COCKPIT (AFT CABIN) (MID CABIN) (FWD CABIN) temperature selector in AUTO position.
- place COMPT/DUCT temperature selector switch in COCKPIT (CABIN/AFT) (CABIN/MID) (CABIN/FWD) position.

(3)On COMPT/DUCT temperature indicator (panel 437VU)
- check temperature value given by duct temperature sensor.

NOTE : Temperature indication is read on DUCT section of COMPT/DUCT temperature indicator.

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Restore system and aircraft to normal operating condition.
(4)Close the following access doors :
(a)for sensor 67HK : 131QW
(b)for sensor 68HK : 132QW
(c)for sensor 69HK : 131HW
(d)for sensor 70HK : 132NW
(5)Close access door 811.
(6)Remove access platform.

AMBIENT TEMPERATURE SENSOR 65HK (66HK) (62HK) (64HK) REMOVAL/INSTALLATION

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

NOTE : Removal/installation procedures are identical for COCKPIT (flight compartment) ambient temperature sensor 65HK, forward cabin 66HK, mid cabin 62HK and aft cabin 64HK.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Torque Wrench - 1 m.daN (88.5 lbf. in.)
B.	Lockwire Dia. 0.8 mm (0.030 in.)
C.	Circuit Breaker Safety Clips
D.	Blanking Plugs/Caps
E.	O-Ring
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 25-23-11, P. Block 401	Ceiling Panels

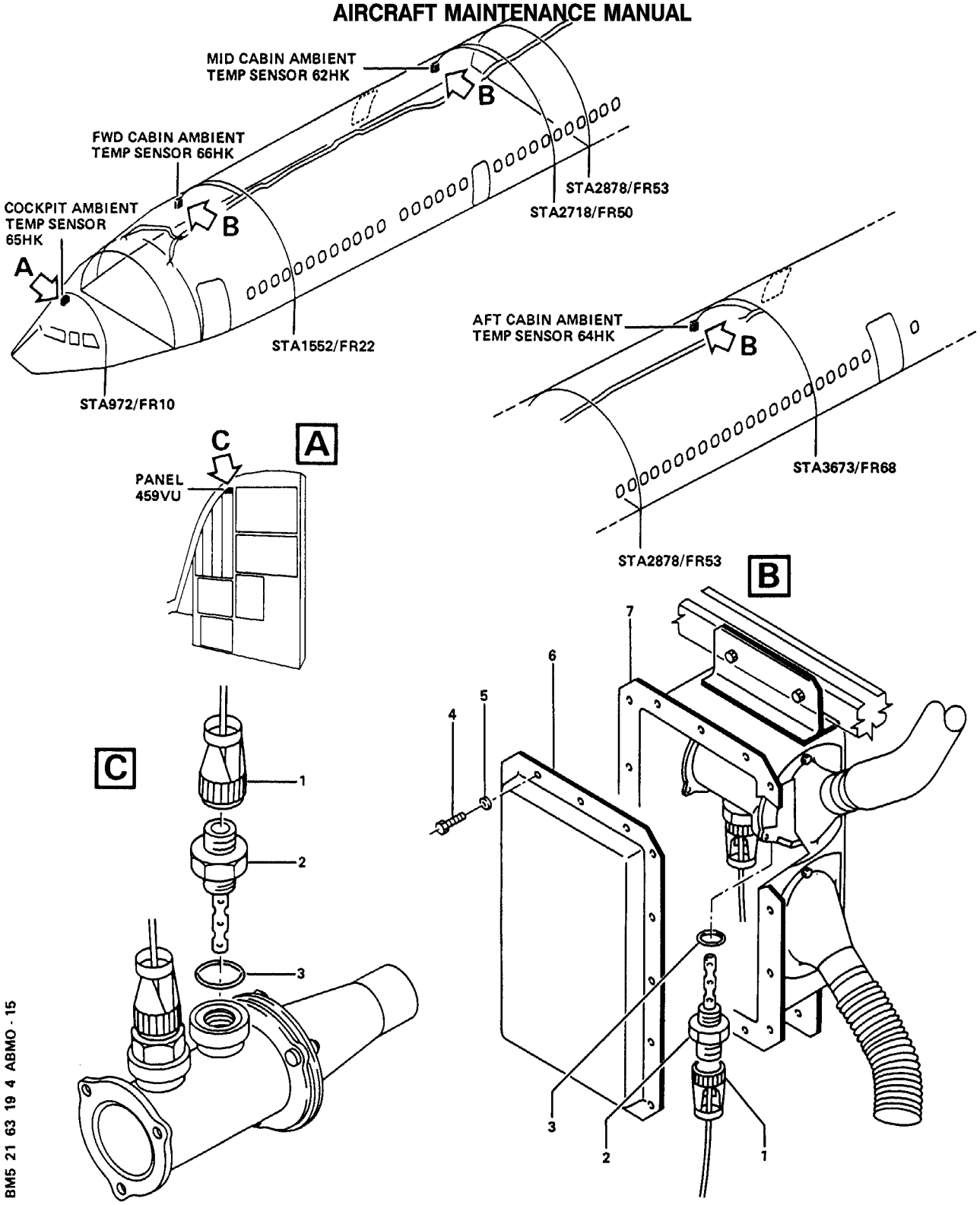
2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP/TEMP IND	54HK	311/H58

(2)COCKPIT (flight compartment) ambient temperature sensor 65HK.
(a)Remove air inlet grille of sensor unit 459VU located in rear panel.
(3)Cabin ambient temperature sensors.
(a)For forward cabin ambient temperature sensor 66HK, remove ceiling panel at STA1499/FR21 and STA1552/FR22 (Ref. 25-23-11, P. Block 401).
(b)For mid cabin ambient temperature sensor 62HK, remove ceiling panel at STA2665/FR49 and STA2718/FR50 (Ref. 25-23-11, P. Block 401) (Ref. 25-24-11, P. Block 401).
(c)For aft cabin ambient temperature sensor 64HK, remove ceiling panel at STA3620/FR67 and STA3673/FR68 (Ref. 25-23-11, P. Block 401).

B. Removal
(1)For cabin sensor 66HK (62HK), (64HK) remove bolts (4), washers (5) and cover (6) from sensor housing (7).
(2)Disconnect electrical connector (1) 65HK-A (66HK-A) (62HK-A), (64HK-A).
(3)Cut and remove lockwire, remove sensor (2) 65HK (66HK), (62HK), (64HK). Remove and discard O-ring (3).
(4)Cap sensor mounting base and electrical connector.



Ambient Temperature Sensor
Figure 401

C. Installation
(1)Remove blanking plugs/caps and check for correct condition of sensor mounting base and electrical connector.
(2)Clean and inspect sensor interface and/or adjacent area.
(3)Install a new O-ring (3) on sensor (2).
(4)Install sensor (2) on housing and tighten; TORQUE to between 0.30 m.daN and 0.95 m.daN (27 and 84 lbf. in.) and wirelock.
(5)Connect electrical connector (1) to sensor (2).
(6)For cabin sensor 66HK (62HK) (64HK) install cover (6), washers (5), bolts (4) on sensor housing (7). Tighten bolts (4).
(7)Remove safety clip and tag and close circuit breaker 54HK.

D. Test
(1)Initial conditions
- Overhead panel circuit breakers closed, particularly those associated with COMPT TEMP and ECAM
- Correct electrical power supply
- Forward services ventilation system in operation.

(2)On COMPT TEMP panel 437VU
- place COCKPIT (AFT CABIN) (MID CABIN) (FWD CABIN) temperature selector in AUTO position.
- place COMPT/DUCT temperature selector switch in COCKPIT (CABIN/AFT) (CABIN/MID) (CABIN/FWD) position.

(3)On COMPT/DUCT temperature indicator (panel 437VU)
- check ambient temperature given by ambient temperature sensor.

NOTE : Temperature indication is read on COMPT section of indicator.

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Install air inlet grille for flight compartment sensor or ceiling panel for cabin sensors (Ref. 25-23-11, P. Block 401).
(3)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Restore system and aircraft to normal operating condition.

CARGO COMPARTMENT TEMPERATURE CONTROL
DESCRIPTION AND OPERATION

1. General

The cargo compartment air conditioning system is controlled either automatically or manually by the temperature control system to maintain the compartment temperature at a predetermined level. The BULK cargo compartment is the only cargo zone having a temperature control capability.

A. Air Supply Sources

The BULK cargo compartment is supplied with air from the following sources to provide the required environmental conditions:

(1) Cabins

Flow of ambient air from cabin zones, via orifices in cabin floor, is routed to areas between cargo compartment walls and fuselage skin.

(2) Hot Air Manifold

Fresh hot air is bled from the hot air manifold and mixed with ambient air from cabin to provide required temperature controlled environment.

B. Temperature Control Process

(1) Temperature control of BULK cargo compartment is provided by an independant system comprising:

- temperature controller, in conjunction with temperature selector switch located in flight compartment.
- monitoring system consisting of temperature indicator sensors, located in cargo compartment and air inlet duct, and fault and valve flap position indicators in flight compartment.

Automatic isolation of conditioned compartment occurs in the event of smoke detection, including deactivation of extraction fan (Ref. 26-16-00) and closing of isolation valve.

(2) Air from cabin zones is mixed with air from hot air manifold. Temperature controller operates the trim air valve in response to demand from temperature selector switch, in conjunction with temperature control sensors in cargo compartment and air inlet duct, when AUTO is selected. On selection of MAN on temperature selector switch, temperature controller is bypassed and trim air valve is manually operated. Air, after conditioning the compartment, is discharged via extraction fan, isolation valve and extraction system ducting.

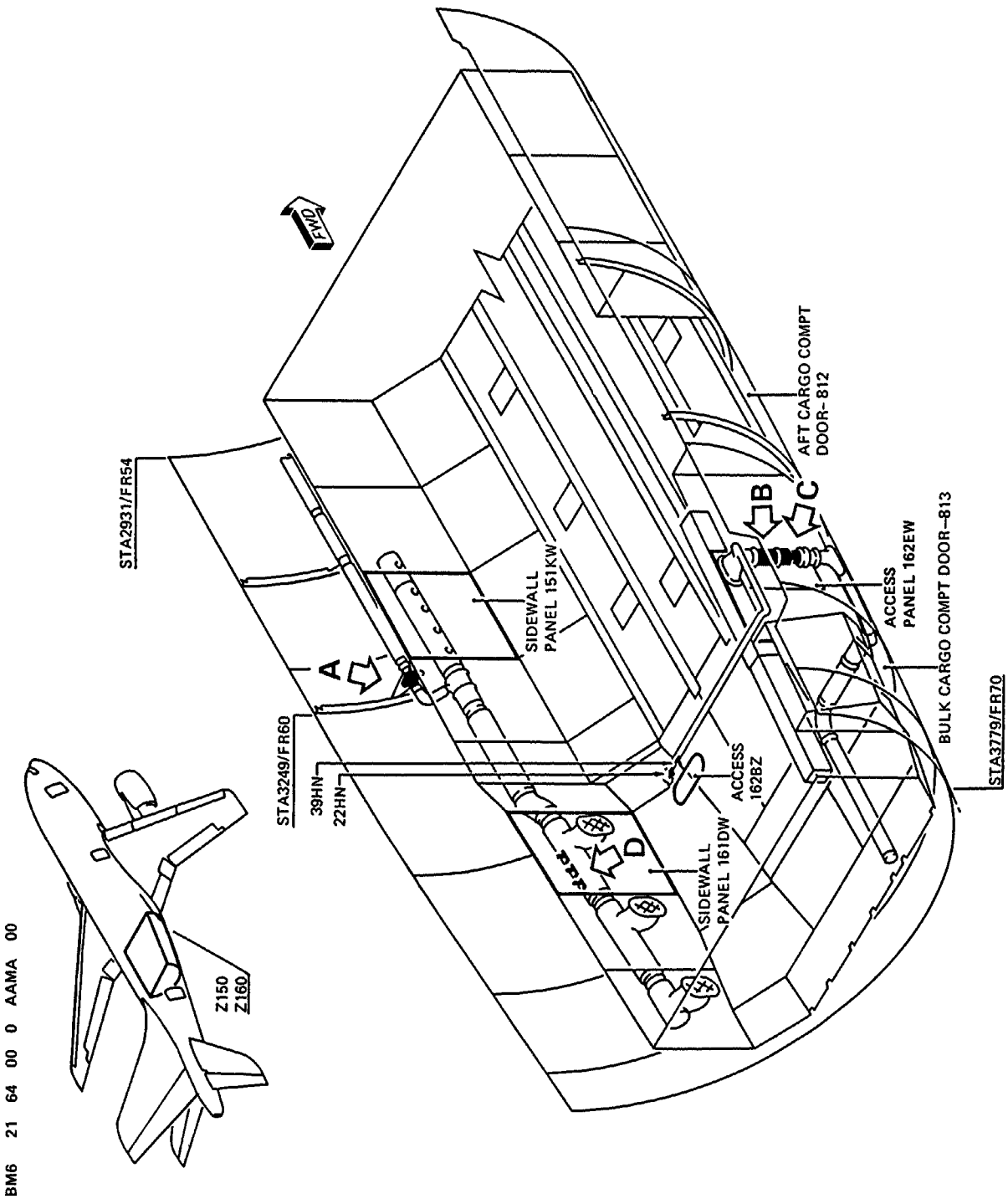
2. Component Location

(Ref. Fig. 001)

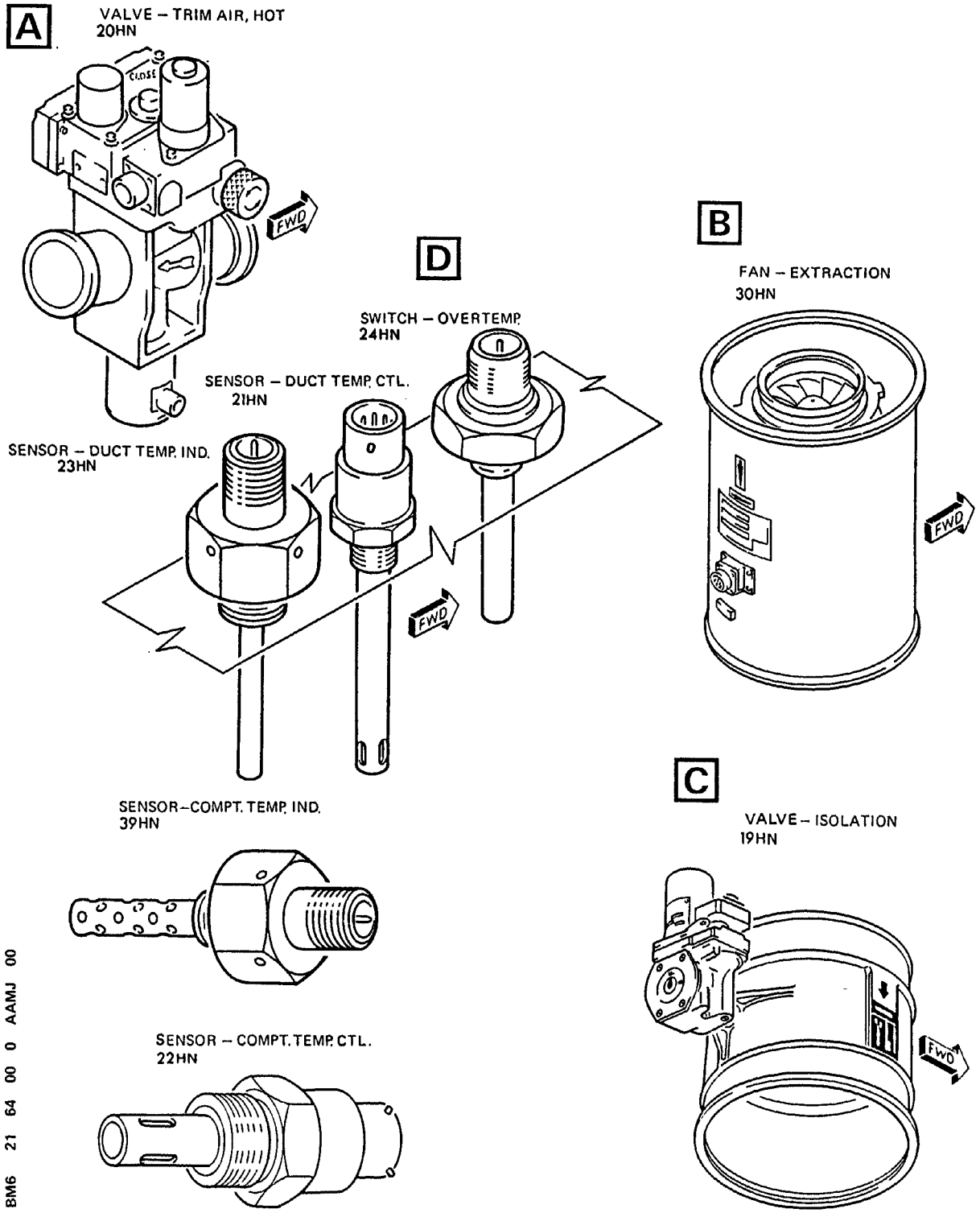
A. BULK Cargo Compartment

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
1HN	RELAY-AUTO CLOSE, SMOKE WARN	282VU	122	121BL	
6HN	P/BSW-ISOL VALVE	437VU	212		
7HN	RELAY-ISOL VALVE FAULT DETECT CLOSE	282VU	122	121BL	
8HN	MFA-BULK CARGO	472VU	212		
9HN	RELAY-ISOL VALVE FAULT DETECT OPEN	282VU	122	121BL	

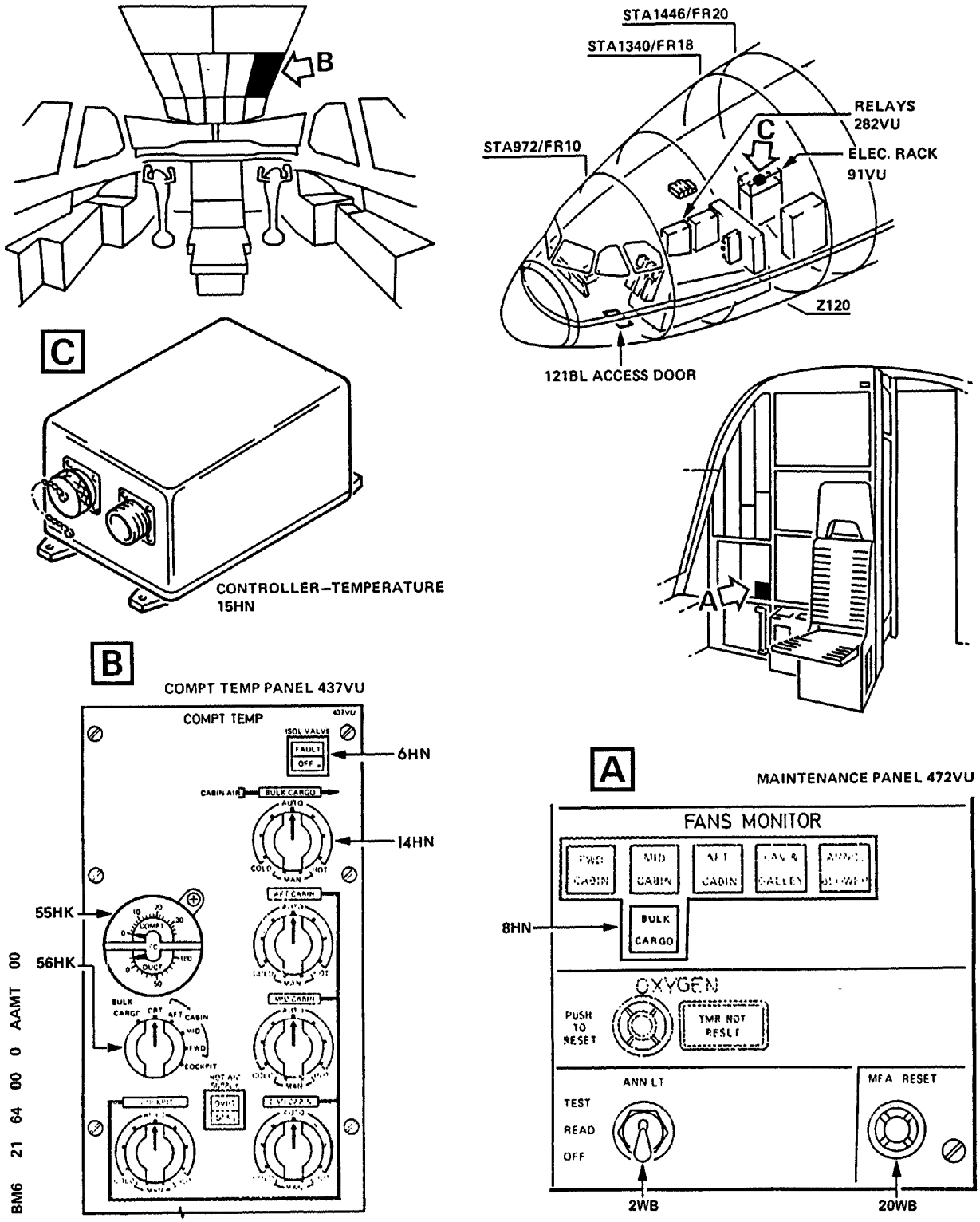
FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
12HN	RELAY-SUPPLY CUTOFF, TEMP CTL	282VU	122	121BL	
13HN	RECTIFIER	282VU	122	121BL	
14HN	SELECTOR-TEMPERATURE	437VU	212		
15HN	CONTROLLER-TEMPERATURE	91VU	122	121BL	
16HN	RELAY-TRIM AIR VALVE, AUTO CLOSE SUPPLY	282VU	122	121BL	
17HN	RELAY-TRIM AIR VALVE, AUTO CLOSE CTL	282VU	122	121BL	
19HN	VALVE-ISOLATION		162	162DW	21-64-34
20HN	VALVE-TRIM AIR, HOT		151	151KW	21-64-32
21HN	SENSOR-DUCT TEMP CONTROL		161	161DW	21-64-11
22HN	SENSOR-COMPT TEMP CONTROL		162	162BZ	21-64-12
23HN	SENSOR-DUCT TEMP INDICATOR		161	161DW	21-64-11
24HN	SWITCH-OVERTEMP		161	161DW	21-64-11
30HN	FAN-EXTRACTION		162	162DW	21-64-33
31HN	RELAY-EXTRACT FAN POWER	282VU	122	121BL	
32HN	RELAY-EXTRACT FAN FAULT DETECT	282VU	122	121BL	
34HN	RELAY-EXTRACT FAN MONITOR	282VU	122	121BL	
39HN	SENSOR-COMPT TEMP INDICATOR		162	162BZ	21-64-12



BULK Cargo Compt Temp Control Components (Sheet 1/3).
Figure 001



BULK Cargo Compt Temp Control Components (Sheet 2/3)
Figure 001



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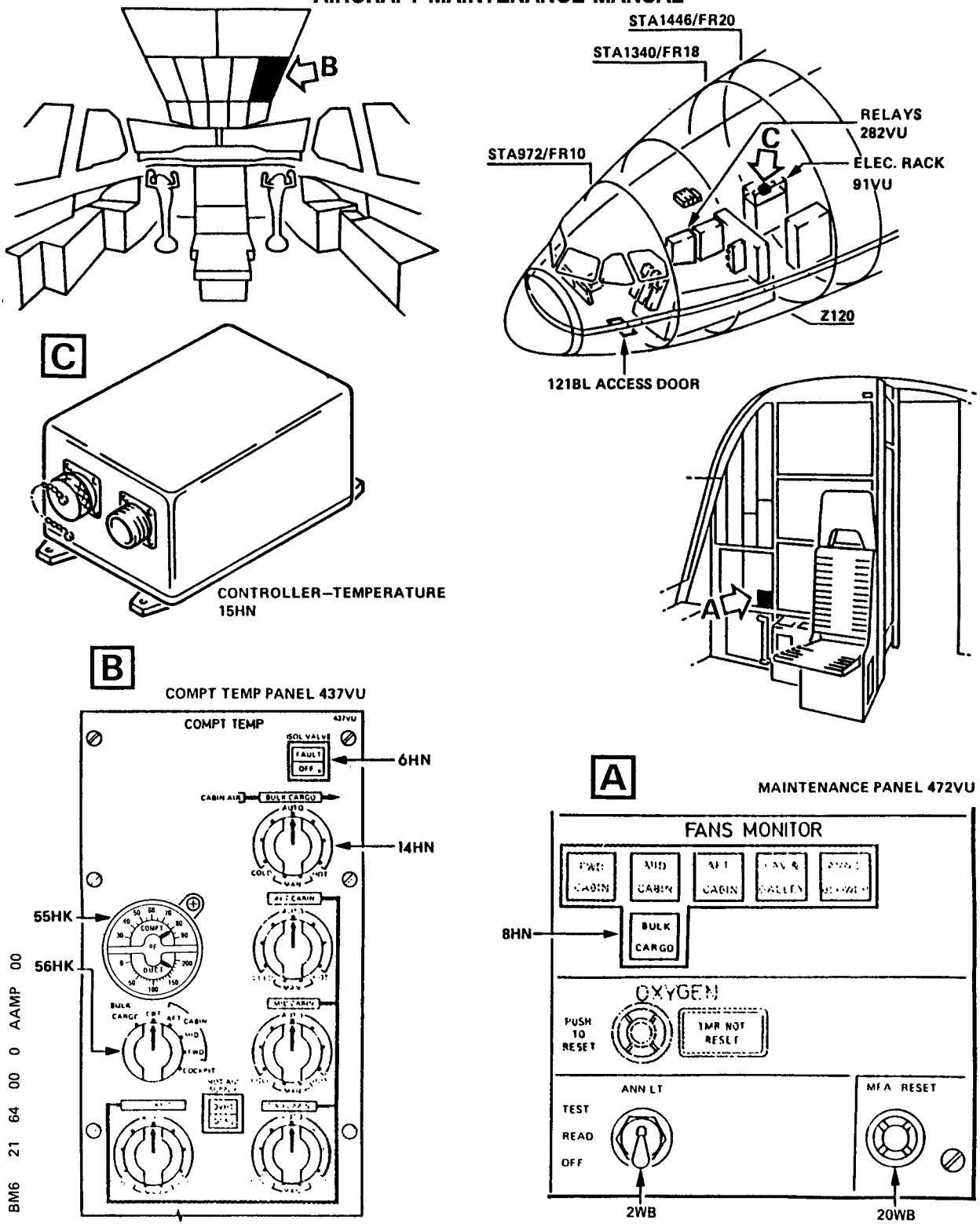
BULK Cargo Compt Temp Control Components (Sheet 3/3)
Figure 001



Cargo Compt Temp Control Components (Sheet 3/3)
Figure 001

C. Interfaces

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
37HK	CONTROLLER-APU/PACK TEMP DEMAND	91VU	212	121BL	21-61-16

3. System Description

Air is supplied to the BULK cargo compartment through a duct along the lower LH side of the compartment. The air is ambient cabin air drawn through orifices in the cabin floor, reheated by additional hot air from the hot air manifold. The hot air supply is controlled by a trim air valve, which regulates the cargo compartment temperature. Temperature control is achieved in a similar manner to that of the cabin zones, using signals from BULK CARGO temp selector switch on COMPT TEMP panel 437VU, located on the cockpit overhead panel, the cargo compartment temperature control sensor and duct temperature control sensor to control the trim air valve.
The air is extracted from the cargo compartment through vents near the ceiling on the RH side by an electric fan. The extracted air from the BULK cargo compartment is passed under the compartment floor to provide heating. The maximum air temperature entering the cargo compartment is limited to 88°C, sensed by an overtemperature switch, located in the cargo compartment supply duct. Should the air temperature exceed this limit, the trim air pressure control valve 11HJ will automatically close (Ref. 21-62-00).
A smoke detection system is also installed in the cargo compartments (Ref. 26-16-00). In case of fire, the system will stop cargo compartment ventilation by automatically closing the extraction duct isolation valve and trim air valve, and deactivating the extraction fan operation.
The cargo compartment temperature control system comprises:
- distribution/extraction system
- temperature control system
- control and indicating system.

A. Distribution/Extraction System (Ref. 21-28-00)

(1) Distribution

Conditioned air is conveyed by ducting on the lower LH section of the AFT and BULK cargo compartments and distributed by outlets located on the BULK cargo compartment LH sidewall.

(2) Extraction

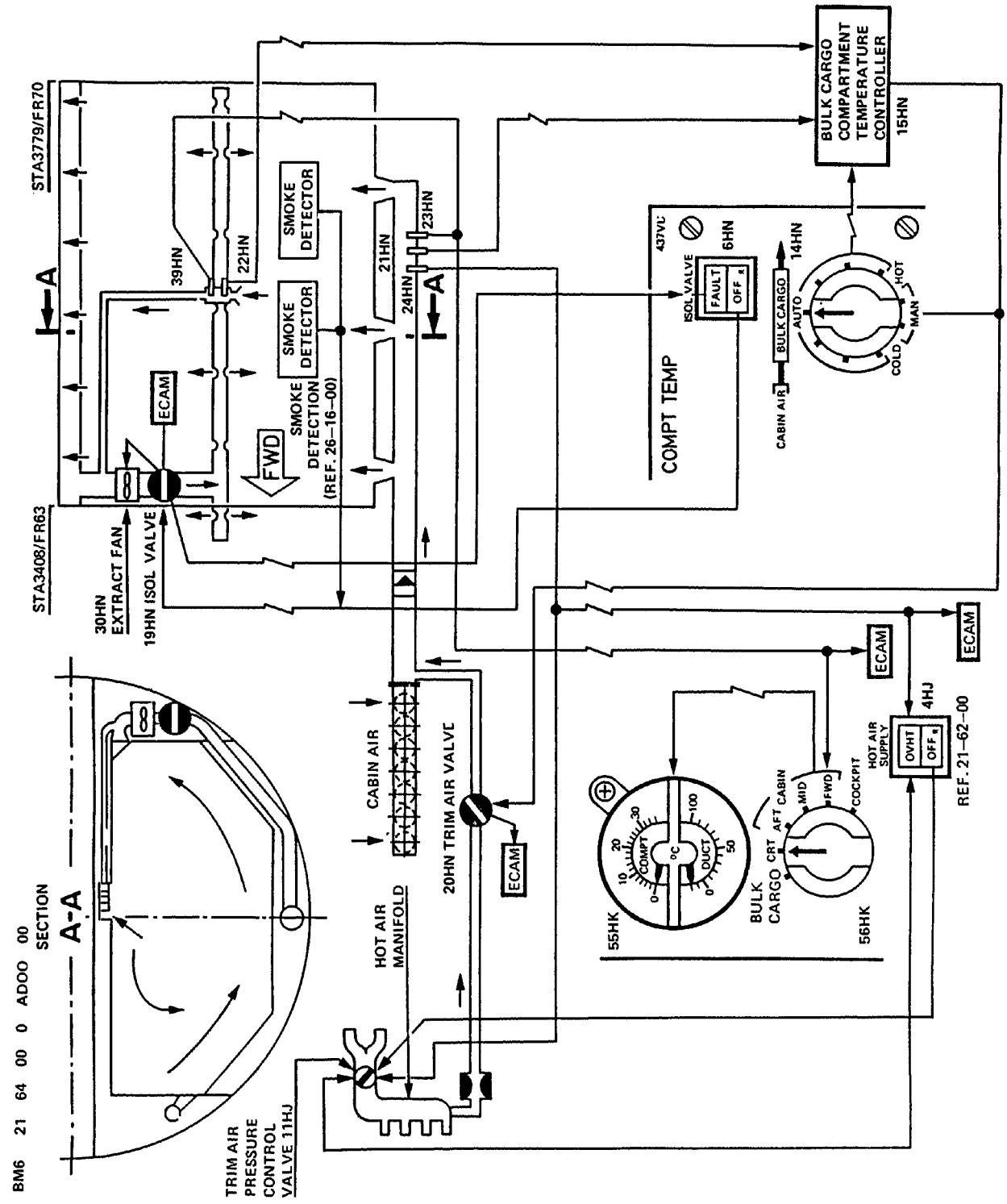
Air is continuously evacuated from the cargo compartment through extraction orifices, located on the top RH sidewall, extraction fan 30HN, via isolation valve 19HN and ducting to the compartment underfloor area.

R **ON A/C 001-100,

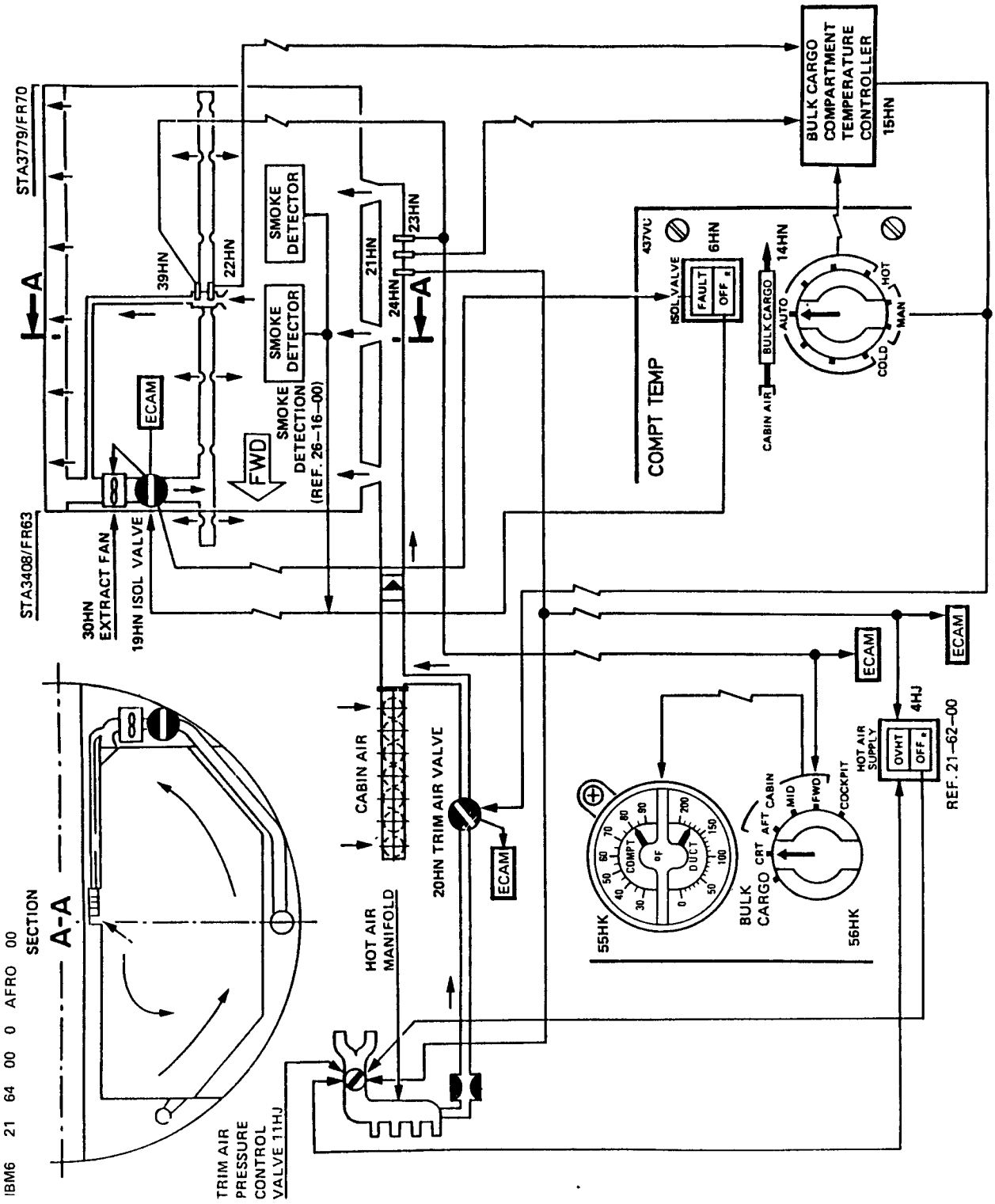
(Ref. Fig. 002)

R **ON A/C 101-200,

R (Ref. Fig. 003)



BULK Cargo Compartment Heating and Ventilating System-Diagram
Figure 002



Bulk Cargo Compt Heating & Ventilation System - Diagram
Figure 003

R **ON A/C ALL

B. Temperature Control System
Temperature is controlled by:
- BULK CARGO temperature selector switch 14HN on COMPT TEMP panel 437VU, located in flight compartment, provides selection of required temperature to BULK cargo compt temperature controller 15HN in automatic mode, or direct to trim air valve 20HN in manual mode,
- temperature controller 15HN controls trim air valve 20HN, in response to resultant of signals from temperature selector switch 14HN, compartment temperature control sensor 22HN, and duct temperature control sensor 21HN,
- trim air valve 20HN regulates inlet flow of hot air from hot air manifold.

The following components protect the system in the event of -
- overheat: overtemp switch 24HN and automatic closing of trim air pressure control valve 11HJ, common to all compartments (Ref. 21-62-00),
- smoke detection: automatic closing of isolation valve 19HN, deactivating of extraction fan 30HN to localize contamination, and closing of trim air valve 20HN (Ref. 26-16-00).

C. Controls and Indicators
System control and indication of operation, including malfunction detection, are provided in flight compartment as follows:

(1)Not applicable

(2)COMPT TEMP PANEL 437VU
The COMPT TEMP panel 437VU is located on cockpit overhead panel and provides the following operation and indication facilities:

(a)BULK CARGO temperature selector switch 14HN provide demand requirements for heating or cooling and for automatic or manual operation.

(b)ISOL VALVE pushbutton switch 6HN (FAULT-OFF/R) for BULK cargo compartment. The isol valve flap is open and temperature control activated when ISOL VALVE pushbutton switch 6HN is selected on. FAULT legend will come on during transition period of isol valve 19HN operation or malfunction.

(c)COMPT/DUCT temperature indicator 55HK, in conjunction with zone selector switch 56HK, monitors temperature of air circulating in compartments by signal of compt temp indicator sensor 39HN and respective of inlet ducting by signal of duct temp indicator sensor 23HN (Ref. 21-63-00). With zone selector switch 56HK in CRT position, COMPT/DUCT temperature indicator 55HK is switched off and temperatures are displayed on ECAM.

(3)Maintenance Panel 472VU

The following controls and indicators are provided on maintenance panel 472VU:

- **FANS MONITOR** section indicator **8HN** stores a signal in event of a fan functional failure on maintenance panel **472VU**. The memory indicators white light comes on if the **ANN LT** toggle switch **2WB** is in the **READ** position and if a signal has been stored. To check memory indicator **8HN** light, the **ANN LT** toggle switch **2WB** is placed in the **TEST** position. When all checks and test are completed **ANN LT** toggle switch **2WB** is returned to the **OFF** position.
  When the **MFA RESET** pushbutton switch is pressed, all lights go off and memory indicator **8HN** is reset.
  NOTE : The above operations are normally carried out by maintenance personnel when the aircraft is on the ground.

R **ON A/C 001-100,

(Ref. Fig. 004)

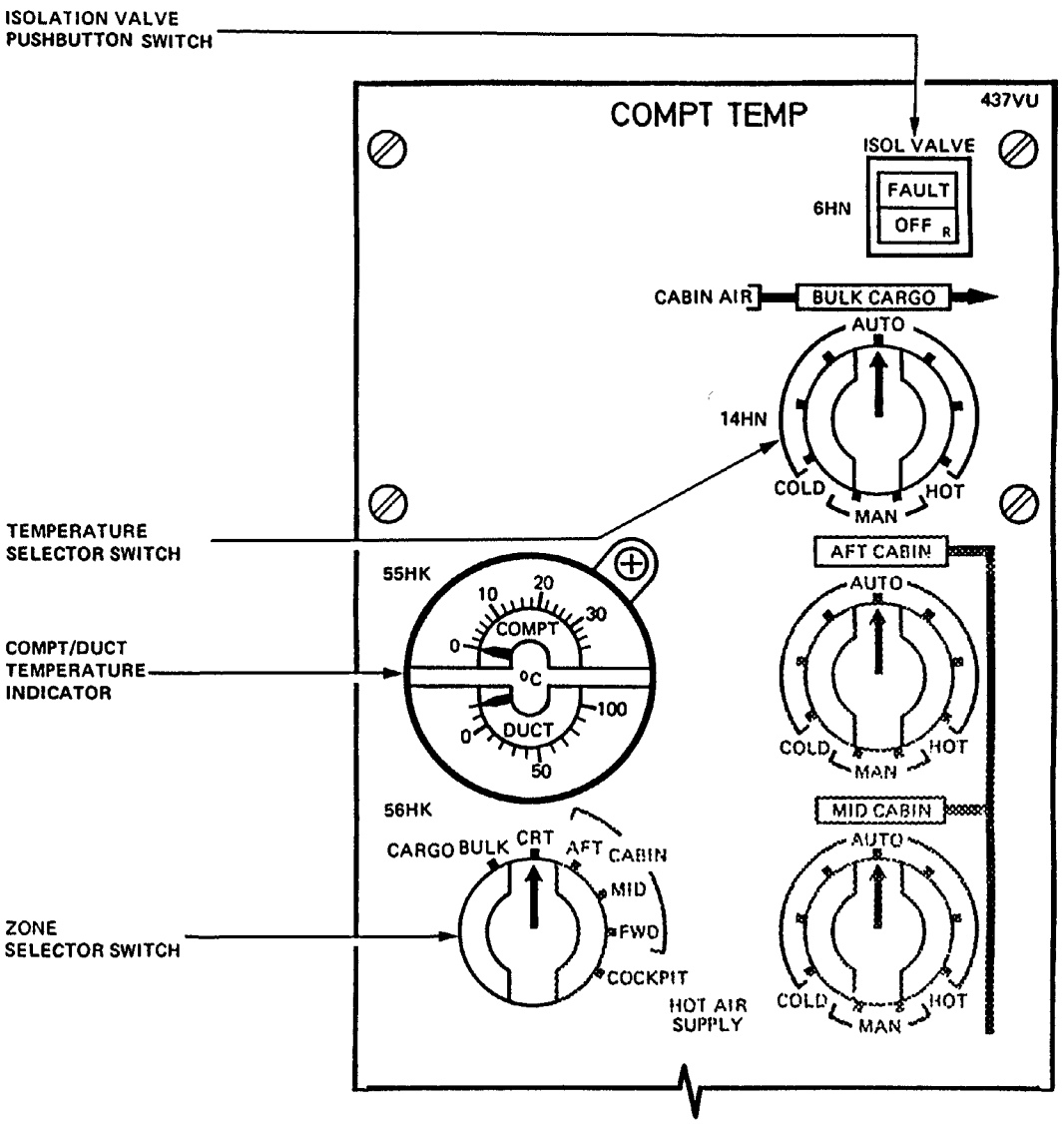
R **ON A/C 101-200,

R (Ref. Fig. 005)

R **ON A/C ALL

(Ref. Fig. 006)

COMPT TEMP PANEL 437VU



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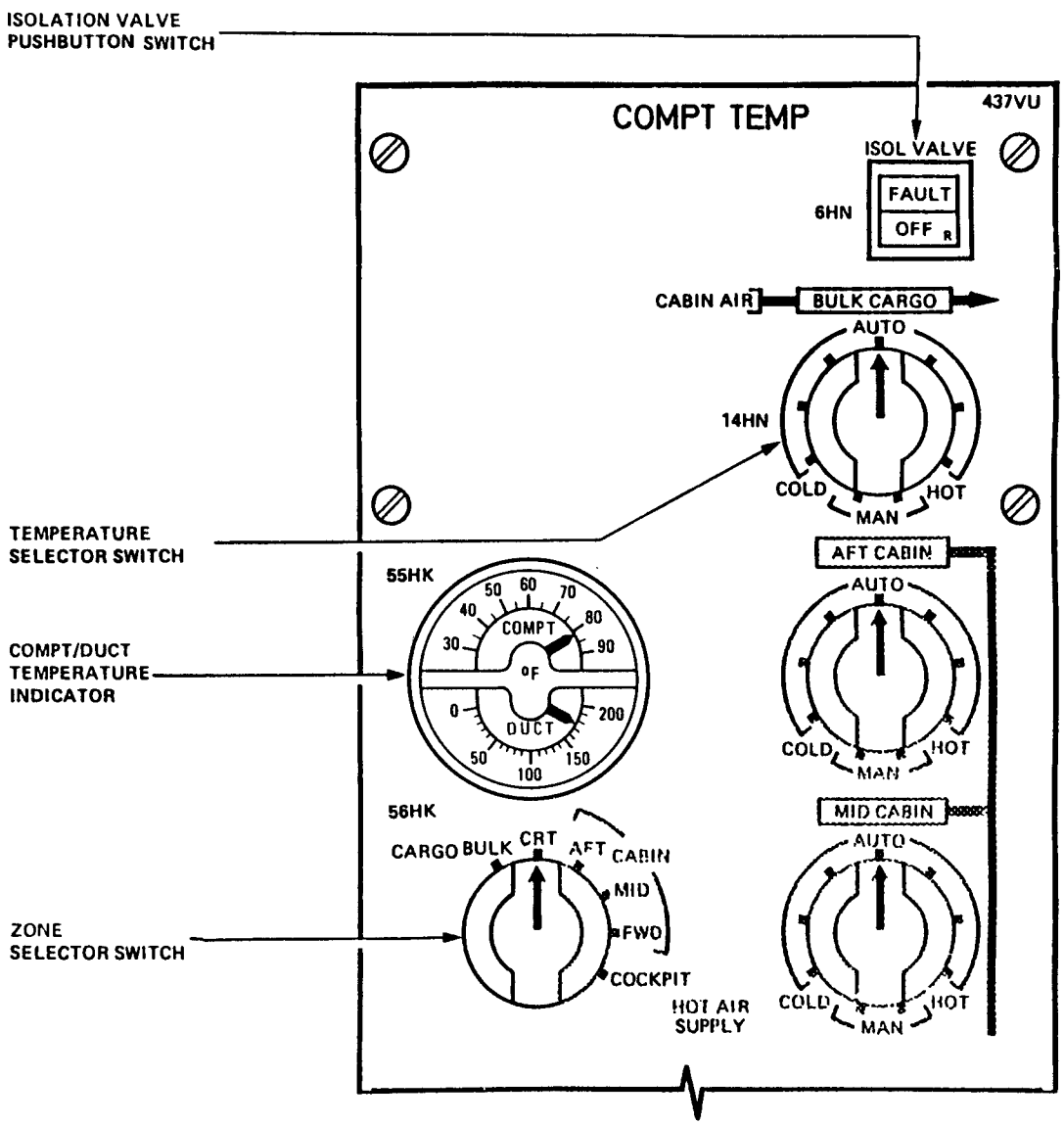
Cargo Compartment Temperature Controls
Figure 004

COMPT TEMP PANEL 437VU



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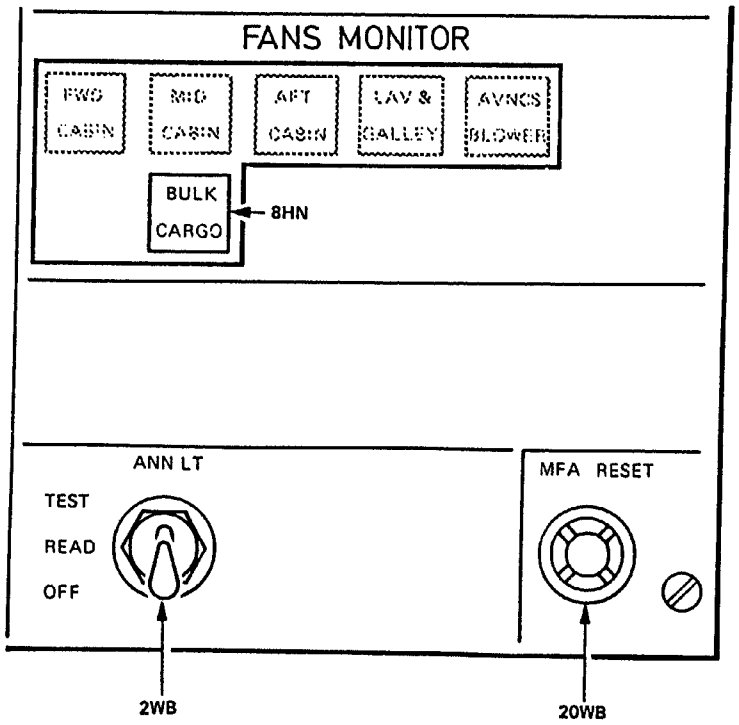
Cargo Compartment Temperature Controls
Figure 005

MAINTENANCE PANEL 472VU



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Maintenance Panel 472VU
Figure 006

4. Component Description

A. Temperature Control Sensors 21HN and 22HN
For controlling purposes, temp control sensors detect the air temperature as follows:
- compartment temp control sensor 22HN monitors the ambient air temperature of the BULK cargo compartment,
- duct temp control sensor 21HN monitors the inlet duct air temperature.

The temp control sensors transmit signals to the BULK cargo compt temperature controller 15HN. The sensing element comprises two glass-encased thermistor beads wired in series and mounted in a probe-type housing incorporating a six-pin electrical connector to facilitate connection to temperature controller 15HN. The housing has four apertures to permit airflow around the thermistor beads. Temperature change is detected by the sensor, as resistance of the sensing element varies with a change in temperature and, in conjunction with temperature controller 15HN, monitors and regulates required temperatures.

B. Temperature Indicator Sensors 23HN and 39HN
For monitoring purposes, temp indicator sensors detect the air temperature as follows:
- compartment temp indicator sensor 39HN monitors the ambient air temperature of the cargo compartment,
- duct temp indicator sensor 23HN monitors the inlet duct air temperature.

These temperatures are indicated, when BULK CARGO is selected at the zone selector switch 56HK, on the COMPT/DUCT temperature indicator 55HK, both located on the COMPT TEMP panel 437VU on cockpit overhead panel, or on the R ECAM display - AIR COND page when CRT is selected at the zone selector switch 56HK.

C. Trim Air Valve 20HN
The trim air valve, an electrically actuated modulating and shutoff valve, comprises:
Body assembly containing butterfly plate and bearing mounted butterfly shaft which extends through the body assembly for connection to secondary worm gear in the actuator assembly.
Actuator assembly comprises a housing containing a primary worm gear, slip clutch, secondary worm gear, camshaft with two cams and two limit auxiliary switches. The primary worm gear is connected to the secondary worm gear through a slip clutch and serves as a connection point for the butterfly shaft manual drive and camshaft. The camshaft extends through the housing for attachment of the visual position indicator and the two cams are attached to the camshaft opposite the two limit auxiliary switches.
Synchro transmitter attached to the body housing comprises transmitter and housing. The transmitter is connected to the butterfly shaft and an electrical connector is fitted for connection of ECAM.
Trim air valve operation in the automatic mode is controlled by temperature controller 15HN to regulate admission of air to maintain the temperature demand, selected on the temperature selector switch 14HN in the AUTO mode. Application of 115 V, 400 Hz power to pins A and

C of the actuator motor opens the valve. The actuator motor rotates primary worm gear and transfers rotation, through the slip clutch and to the secondary worm gear, to drive the camshaft, manual drive and butterfly shaft.

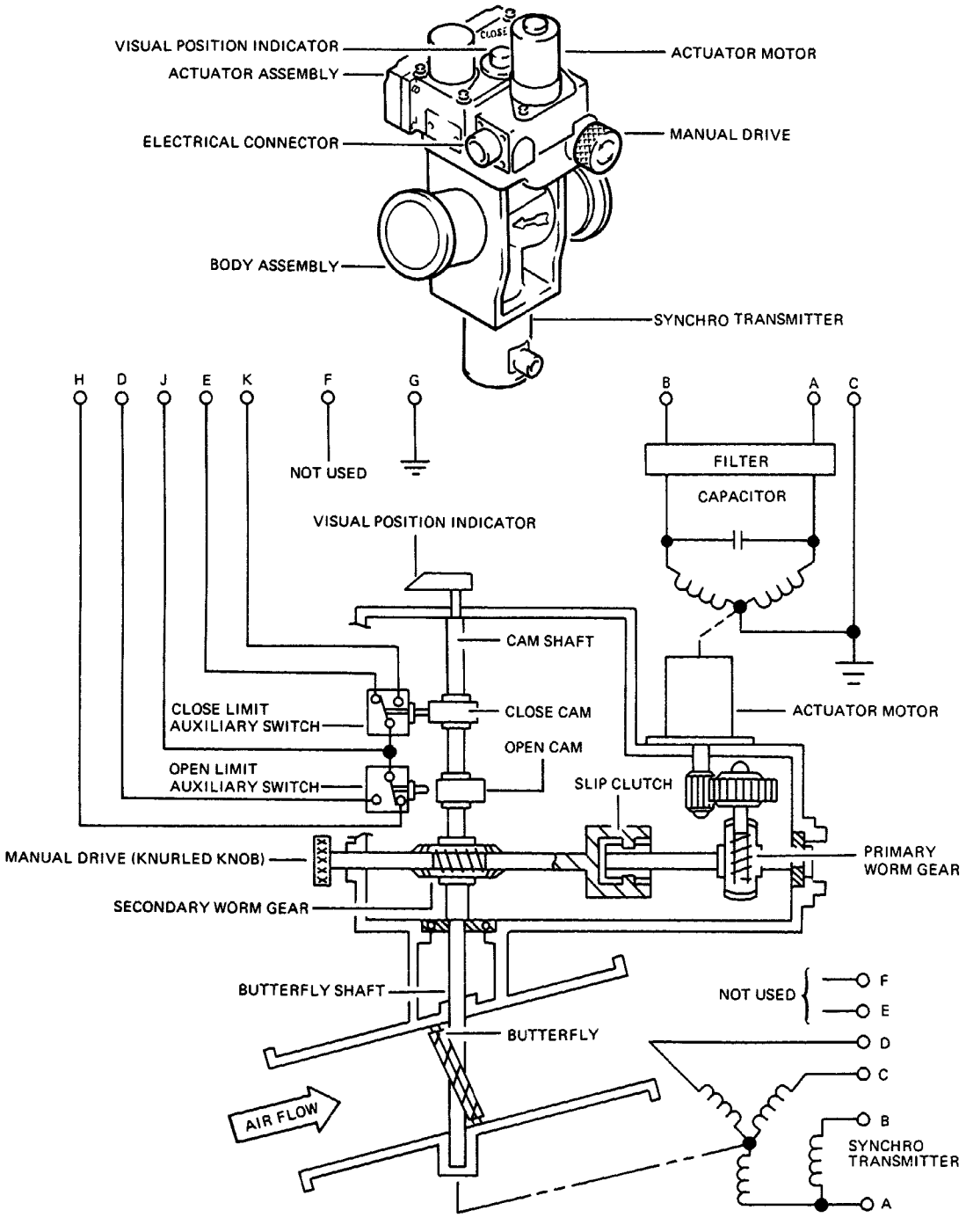
Both cams are synchronized through the secondary worm gear with the butterfly shaft movement. Continuity exists between pins H and J until butterfly is within three to eight degrees from fully opened position, when the a cam actuates the open limit auxiliary switch. Continuity then exists between pins D and J when butterfly is within three degrees of fully opened position. Both worm gears retain the butterfly in static position when the actuator motor is de-energized.

Application of power to pins B and C of actuator drives primary worm gear in the close direction, rotational movement being transferred through slip clutch, secondary worm gear and to butterfly shaft so that butterfly moves in the closed direction. Continuity exists between pins J and K until butterfly is within three to eight degrees of fully closed position when the close cam actuates the close limit auxiliary switch and continuity exists between pins E and J.

The visual position indicator rotates with the camshaft and indicates the butterfly position, and the butterfly shaft drives the synchro transmitter, providing a signal directly proportional to the butterfly position to the R ECAM display - AIR COND page.

Rotation of manual drive will rotate the camshaft, visual position indicator and butterfly shaft.

(Ref. Fig. 007)



Trim Air Valve
Figure 007

D. Cargo Compt Temperature Controller 15HN

The upper deck zone temperature controllers (Ref. 21-63-00) and BULK cargo compartment temperature controller are identical in function and similar in their construction with the exception that the bridge and temperature selector switch 14HN summing network component values differ to obtain lower temperatures in the BULK cargo compartment with the temperature selector switch in AUTO mode. In the MAN mode the controller is bypassed.

The controller is an electronic assembly of modular construction, mounted on a chassis with a metal cover, and comprises:

- power module
- input module
- modulator module
- gate module
- output module
- test circuit.

Mounted on the front plate of the controller are:

- an electrical connector for connection to the control system
- a BITE connector with dust cover.

The power module converts 115V, 400Hz from the electric network to positive and negative 15.5, 15 and 1.9V DC.

The input module compares the demand signal from the temperature selector switch 14HN on COMPT TEMP panel 437VU, with the compt temperature control sensor 22HN signal.

The output signal is generated and, if necessary, modified by the duct temperature control sensor 21HN to prevent duct temperature reaching extreme limits during control action. Polarity and amplitude of the demand output signal determines the direction and rate of the trim air valve actuator drive generated by temp controller.

The modulator module comprises two integrated channels with a common input. The signal from the input module is processed, and signals to actuator coils for operation of the trim air valve are generated.

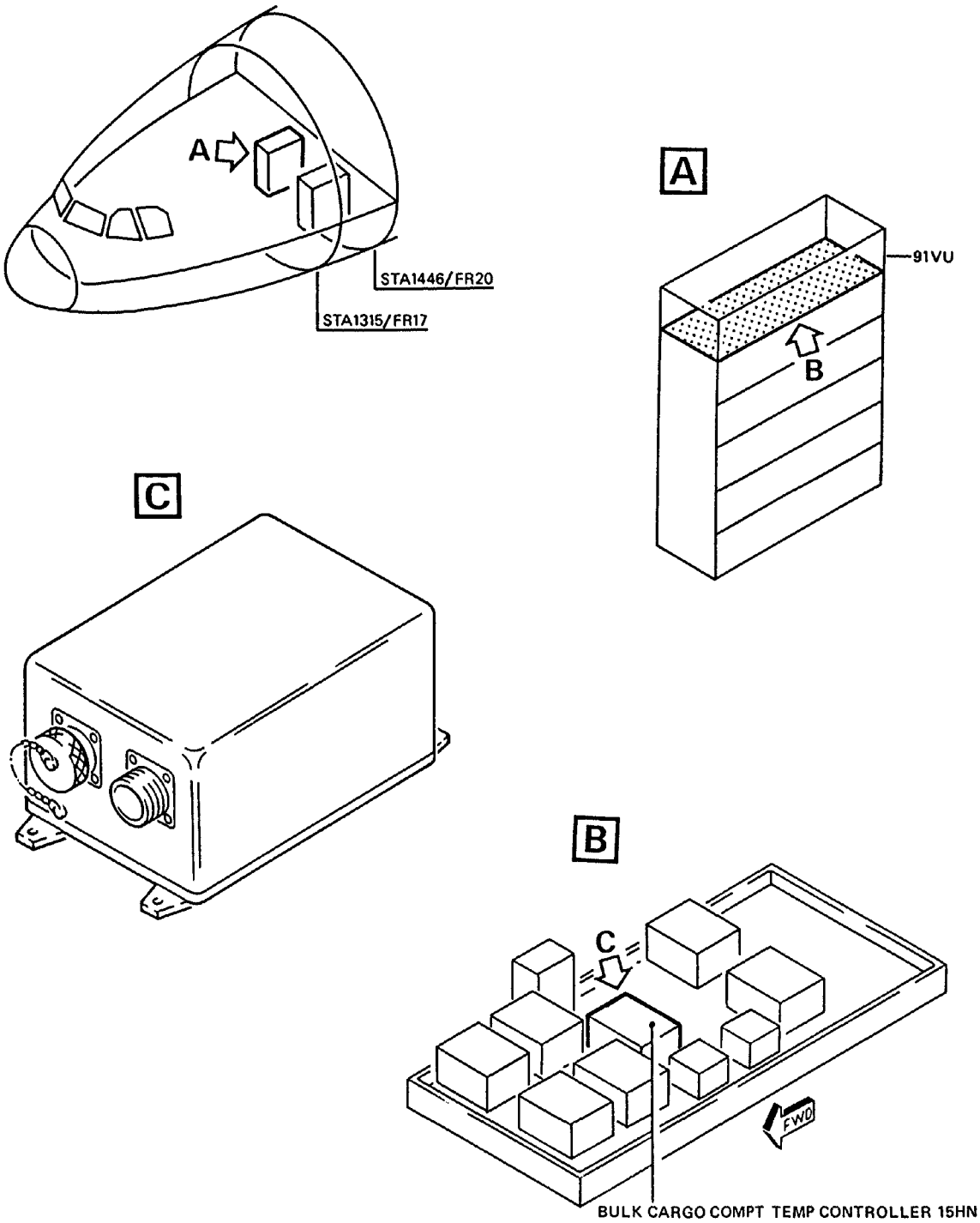
The gate module comprises two separate channels, trim air valve close-drive and trim air valve open-drive, where drive signal is synchronized and inhibited when fully open or fully closed position is reached.

The module contains an overcurrent protection circuit.

The output module comprises two indentical channels, close-drive and open-drive for the trim air valve 20HN, with overcurrent sensing transformers.

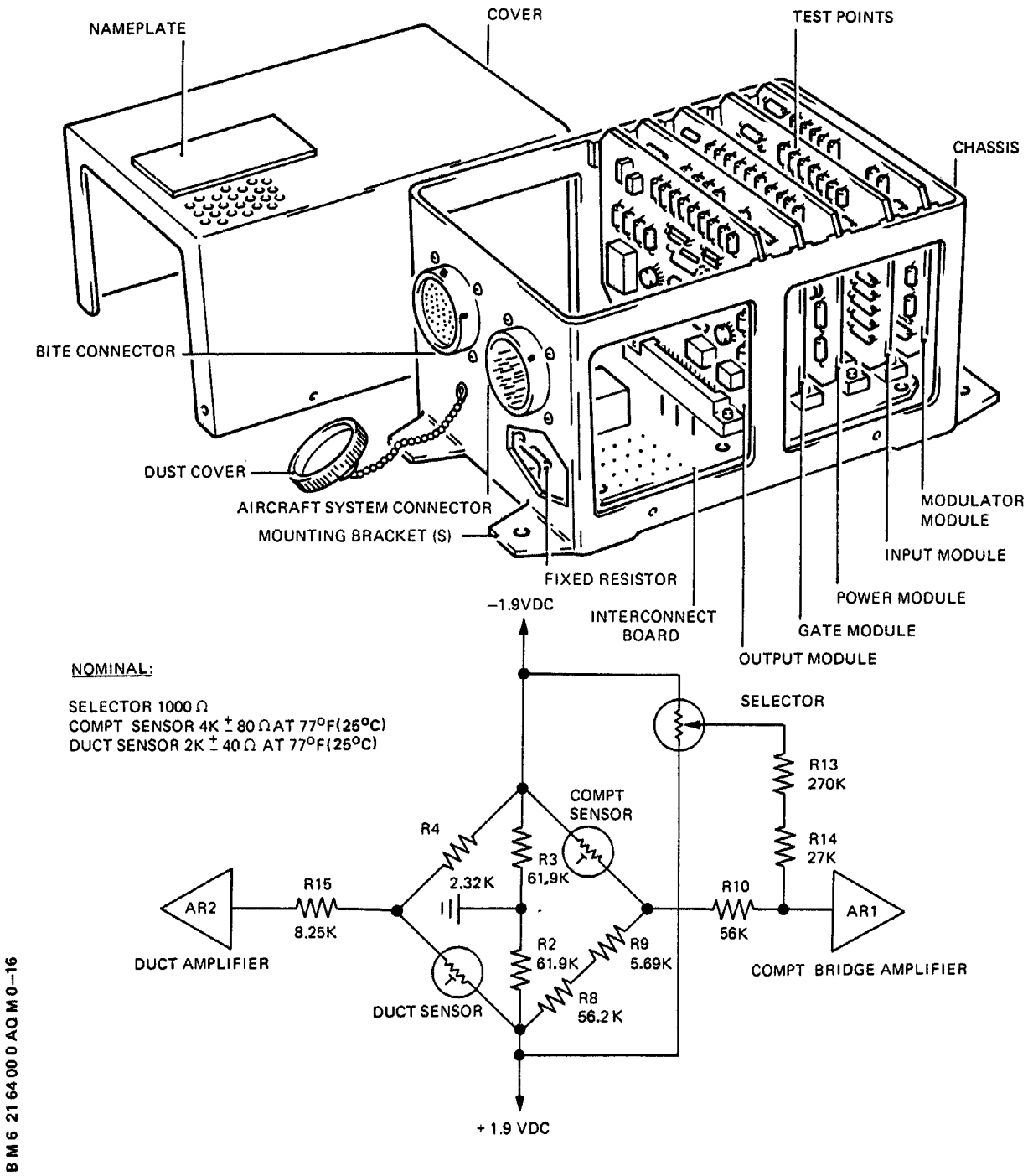
(Ref. Fig. 008)

(Ref. Fig. 009)



BM6 21 64 00 0 ARNO 00

Temperature Controller Location
Figure 008



Temperature Controller with
Bridge Circuit Schematic
Figure 009

E. BULK CARGO Temperature Selector Switch 14HN

The temp selector switch provides facility for automatic or manual adjustment of the trim air valve 20HN, to provide required ambient temperature in the cargo compartments.

The temp selector switch comprises potentiometer/switch assembly, forming one branch of an electrical bridge, operated by rotation of a shaft. The assembly is enclosed in a cylindrical housing with an electrical connector to facilitate electrical connections to the temperature control system.

The control knob on the end of the selector shaft has a 360° rotation capability over the face of the selector, 270° cover graduations in the automatic mode and 45°, selectable right or left from spring-loaded neutral position, in the manual mode. Automatic mode of operation is achieved through the 270° AUTO arc - extreme clockwise rotation representing maximum heat demand.

Manual mode - left graduation provides minimum demand while right graduation provides maximum demand.

(1)Automatic Control Mode (AUTO)

Rotation of selector switch unbalances the bridge, so producing an error signal in the temperature controller 15HN, which amends the demand signal to the trim air valve 20HN, to provide required value at the compartment temperature control sensor 22HN.

The bridge, on completion of the cycle, will be balanced and the temperature control system becomes inactive.

During automatic mode, the following selector switch contacts remain closed:

- 9 and 10, to complete the power supply required by temperature control circuit.
- 5, 6, 7 and 8, to complete electrical connection from the temperature controller 15HN to the trim air valve 20HN.

(2)Manual Control Mode (MAN)

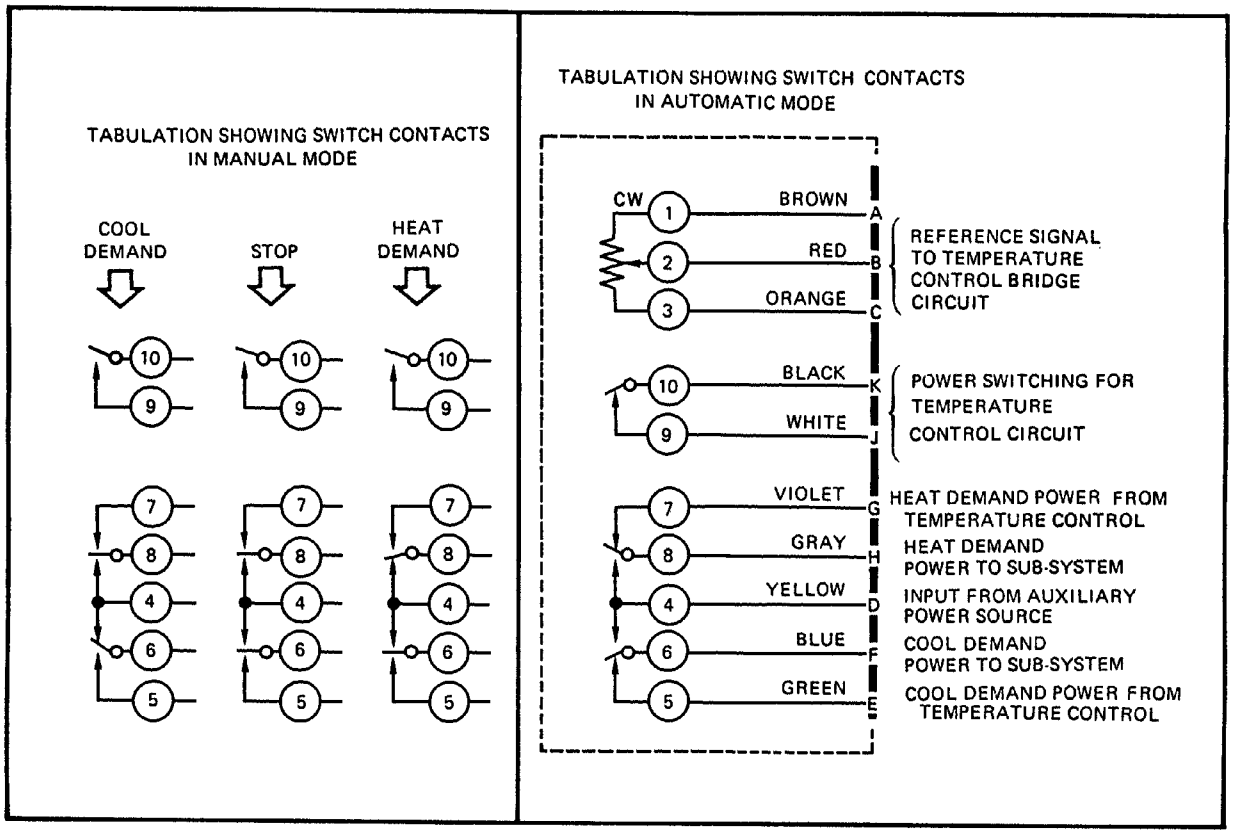
On rotation of the selector switch shaft out of the automatic range, the potentiometer resistance ceases to vary, and internal switches isolate the automatic mode and engage the manual mode of temperature control.

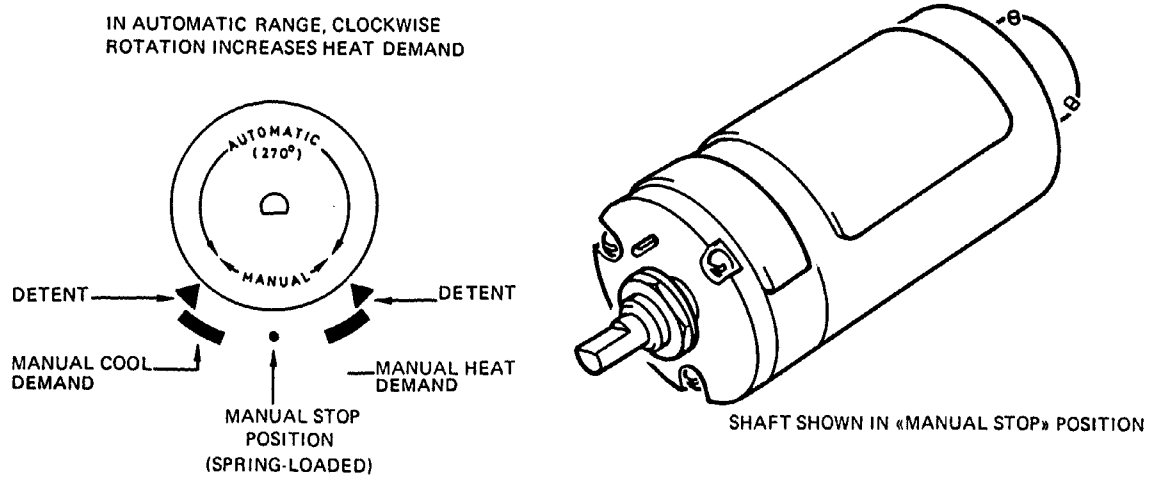
Switch contacts 9 and 10 open, remaining so during the manual mode of control, to remove power from the automatic temperature control circuit.

On cool demand selection, contacts 4 and 6 close to complete the auxiliary circuit to the trim air valve 20HN, which operates as per automatic mode, and switch contacts 7 and 8 are open and contact 5 is internally isolated.

On heat demand selection, switch contacts 4 and 8 close to complete the auxiliary circuit to the trim air valve 20HN operation as per automatic mode, and switch contacts 5 and 6 are open and contact 7 is internally isolated. In the manual stop, centrally spring-loaded position, switch contact 4 is internally isolated and as contacts 9 and 10 are open, power cannot be supplied to the trim air valve 20HN, therefore the valve flap remains in the last selected position.

(Ref. Fig. 010)





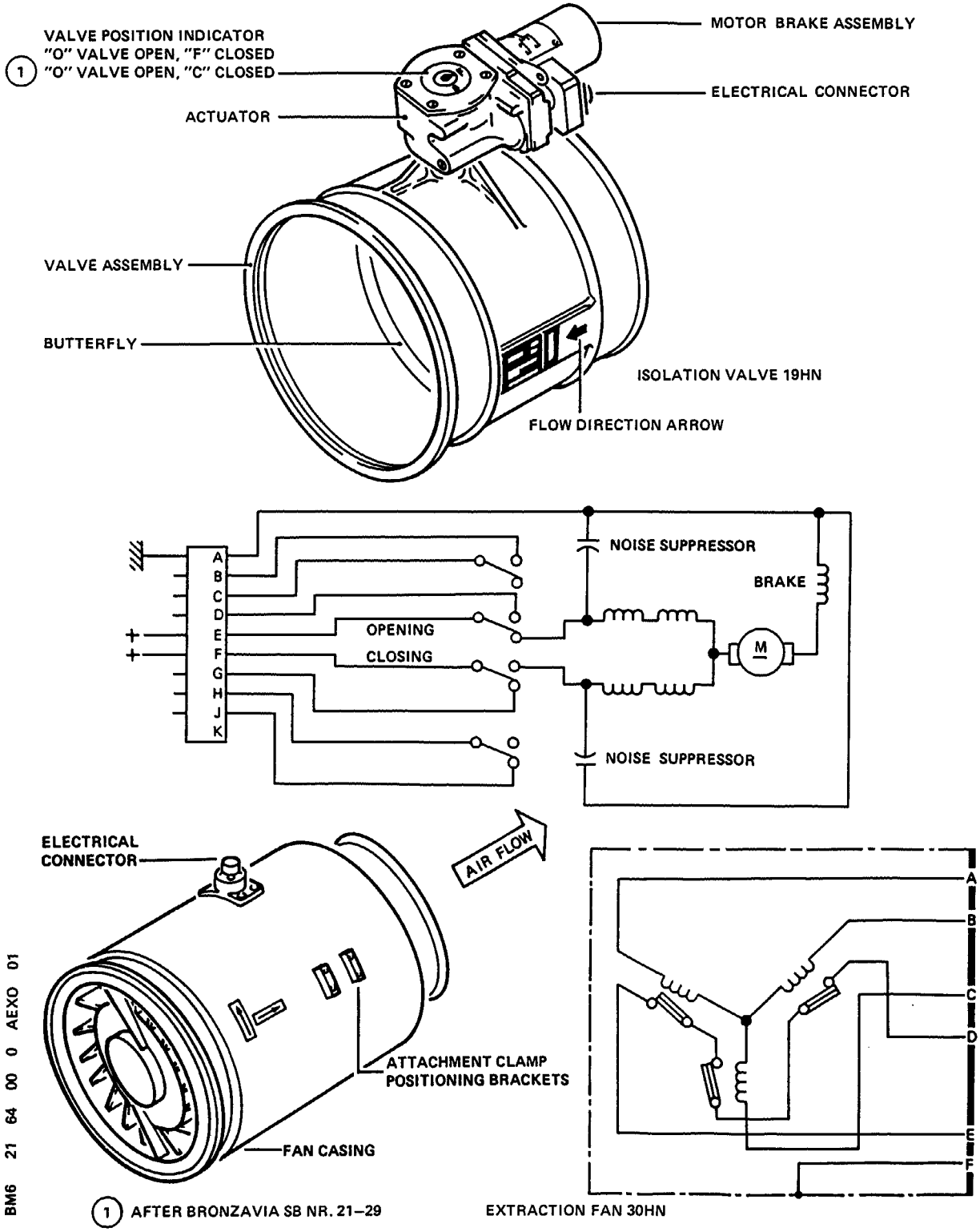
BM6 21 64 00 0 ATMO 00

Temperature Selector Switch
Figure 010

F. Overtemperature Switch 24HN
An overheat condition in the BULK cargo compartment inlet duct is detected by overtemp switch 24HN and a signal is transmitted to trim air pressure control valve 11HJ, and OVHT legend of the HOT AIR/SUPPLY pushbutton switch 4HJ on COMPT TEMP panel 437VU with ECAM system indicating overheat location (Ref. 21-62-00). The overtemp switch 24HN comprises a bimetallic element enclosed in a steel probe and, mounted at the switch end of the fitting, electrical connections in a hermetically sealed connector.

G. Isolation Valve 19HN
The isolation valve, a butterfly type, controlled by an actuator, under normal conditions is open to facilitate circulation of air in the cargo compartment. In the event of smoke being detected by the smoke detector (Ref. 26-16-00), the isolation valve flap will be driven to the fully closed position to prevent spread of contamination, in addition to the SMOKE warning display on CARGO COMPT SMOKE DET panel 433VU.
On completion of closing circuit, the isolation valve control relay is energized to activate the FANS MONITOR/BULK/CARGO MFA 8HN (Ref. 33-17-00) on maintenance panel 472VU.

H. Extraction Fan 30HN
The extraction fan provides flow of air to aid circulation and stabilize required ambient temperature under normal conditions, but if smoke is detected, the isolation valve 19HN closes and the extraction fan 30HN will be de-energized.
The extraction fan is a 115V AC, 3-phase type, with heat detectors to interrupt its power supply in the event of a malfunction via a three-second delay fan fault detect relay 32HN. With the delay fan fault detect relay energized, the FANS MONITOR/BULK/CARGO MFA 8HN (Ref. 33-17-00) is activated on maintenance panel 472VU.
(Ref. Fig. 011)



Cargo Compartment Air Extraction Components
Figure 011

5. Controls and Indicators

A. Flight Compartment

- COMPT TEMP Panel 437VU -

(1)BULK CARGO/ISOL VALVE Pushbutton Switch 6HN

Operates the isolation valve 19HN and extraction fan 30HN for air extraction from the BULK cargo compartment. The extraction fan operates only if the isolation valve is fully opened.

On - (pushbutton switch pressed) isolation valve opens, extraction fan starts running, except when a smoke warning exists in the BULK cargo compartment, then the isolation valve is automatically closed and the extraction fan is deactivated.

OFF/R - (pushbutton switch released) isolation valve closes and extraction fan is switched off - OFF/R legend white light comes on. OFF/R must be reset after automatic closure for confirmation and for resetting of smoke detection circuit (Ref. 26-16-00).

FAULT - the FAULT legend amber light comes on whenever the isolation valve flap is not in the fully opened or fully closed position.

(2)BULK CARGO Temperature Selector Switch 14HN

The heating system is selectable to give a lower mean temperature limit between 5°C and 26°C (± 2°C). This system provides variable control in the heating mode only.

AUTO - automatic heating relative to temperature selector switch 14HN, selector position from COLD to HOT.

MAN - when the temperature selector switch 14HN is rotated to the bottom quadrant, it becomes spring-loaded to the center MAN position. Heating control is manually achieved through the operation of the trim air valve 20HN.

- HOT - trim air valve opens.

- FANS MONITOR Section of Maintenance Panel 472VU -

(3)BULK/CARGO Memorized Fault Annunciator (MFA) 8HN

This annunciator stores a signal, if an extraction fan malfunction should occur.

(4)ANN LT Toggle Switch 2WB

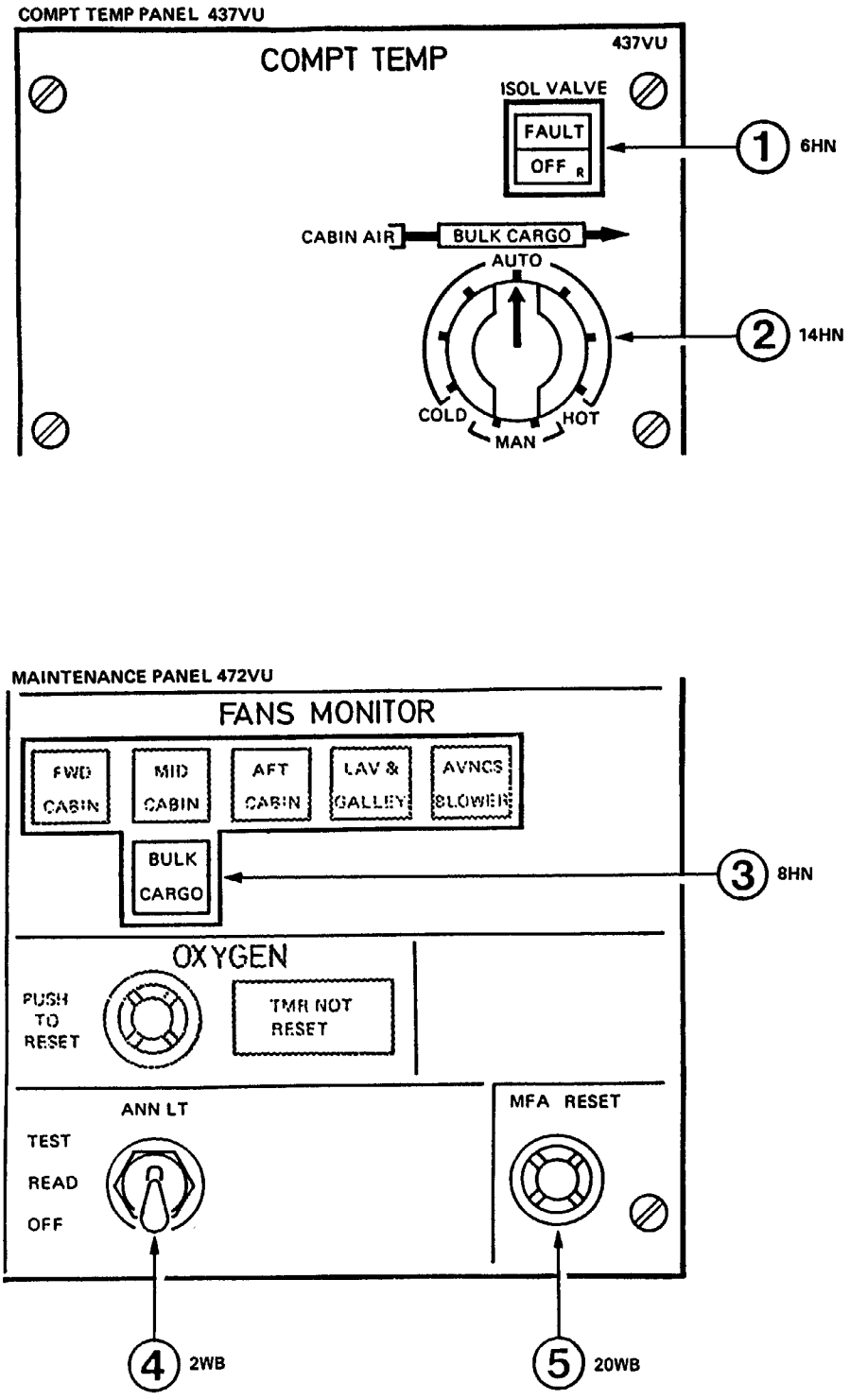
The ANN LT toggle switch controls all MFA indicators on maintenance panel 472VU.

The MFA white lights come on if the ANN LT toggle switch 2WB is in the READ position and if a signal has been stored. To check all MFA lights, the ANN LT toggle switch is placed in TEST position. When all tests and checks have been completed, ANN LT toggle switch has to be switched back to the OFF position.

(5)MFA RESET Pushbutton Switch 20WB

When pressed, all MFA memory circuits on this panel are reset.

(Ref. Fig. 012)



BM6 21 64 00 0 AJPO 00

Temp Controls and Indicators
Figure 012

6. System Operation

A. System Activation

In the system deactivated state, with the **BULK CARGO/ ISOL VALVE** pushbutton switch **6HN** released on **COMPT TEMP** panel **437VU, 28 V DC** from busbar **303PP** via circuit breaker **2HN,** is supplied to temp control supply cutoff relay **12HN** and temp control valve - auto close relay **17HN** with the ground return through the **BULK CARGO/ISOL VALVE** pushbutton switch **6HN.**

When the **BULK CARGO/ISOL VALVE** pushbutton switch is pressed, the ground contact of the temp control relays is broken. De-energizing the temp control supply cutoff relay **12HN** accomplishes the following:

- **115 V AC** from busbar **105XP** via circuit breaker **4HN** is supplied to the **MAN** portion of **BULK CARGO** temp selector switch **14HN** on **COMPT TEMP** panel **437VU.**
- **115 V AC** from busbar **105XP-C** via circuit breaker **5HN** is supplied through **AUTO/MAN** select portion **(AUTO** selected) of temp selector switch **14HN** to the **BULK CARGO** temp controller **15HN** power supply.

De-energizing the temp control - valve auto close relay **17HN** transfers control and monitor of the trim air valve **20HN** from auto close supply relay **16HN** to temp controller **15HN** and temp selector switch **14HN.**

B. Temperature Control

(1)Automatic (AUTO) Selected

The **BULK CARGO** temp controller **15HN** input module compares the signal of compt temp control sensor **22HN** with the signal of temp selector switch **14HN** on **COMPT TEMP** panel **437VU** to produce a single demand output signal of the modulator module. This single demand output signal is modified by a signal from the duct temp control sensor **21HN** as necessary to prevent the duct temperature from reaching extreme limits of **74°C (165°F)** maximum during a control action. The polarity and amplitude of the resultant signal determines the direction and rate of the trim air valve actuator drive generated by the temp controller **15HN.**

The **BULK CARGO** temp controller modulator module amplifiers (Schmitt-Trigger) are biased in opposite directions resulting in the close drive channel responding to positive demand signal inputs and the open drive channel responding to negative demand signal inputs. The modulator module also will inhibit the open or close drive channel responding to output when the trim air valve actuator reaches the fully opened or fully closed position. The overcurrent protection circuits inhibit both drive channels under conditions of excessive load currents.

(a)Temperature Increase/Decrease Condition

Under the condition when the temperature selector switch **14HN** is increased (clockwise rotation on **COMPT TEMP** panel **437VU)** demanding more heat, a positive potential is created in the temp selector switch and then transferred as a reference signal to the temp controller **15HN.** This signal is amplified, interrogated and then converted to **115V AC, 400 Hz** pulse output to the trim air valve actuator open drive coil.

The operation under a decreased demand condition is similar except that the signal is of opposite polarity resulting in the **BULK CARGO** temp controller output being sent to the trim air valve actuator close drive coil.

(b)No demand Condition

BULK CARGO temperature controller balance is achieved when the compartment sensed temperature is equal to the compartment demand temperature. Under this condition there is no output to the trim air valve actuator.

(2)Manual **(MAN)** Selected

Rotating the temperature selector switch **14HN** in either direction out of the **AUTO** control range on **COMPT TEMP** panel **437VU**, results in the following:

- the potentiometer ceases to track, reference signals to temperature controller **15HN** cease;
- internal switches are operated to de-energize the temp controller **15HN**;
- internal switches are operated to engage the manual mode of temperature control;
- the trim air valve actuator remains in the last selected position,
- temp selector switch is spring-loaded to the neutral stop position of the **MAN** control range.

Control of the trim air valve **20HN** in the **MAN** range is accomplished by positioning the temp selector switch **14HN** in either **HOT** or **COLD** sectors, supplying **115V AC** from busbar **105XP** through circuit breaker **4HN** to the respective open or close drive of the trim air valve **20HN**.

NOTE : Since the automatic temp controller **15HN** is bypassed in the **MAN** mode, the following monitor functions will not be operative:

- trim air valve actuator limit switch signals (monitor valve position using **R ECAM** system display - **AIR COND** page).
- nominal 74°C (165°) inlet duct temperature limit.

(Ref. Fig. 013)

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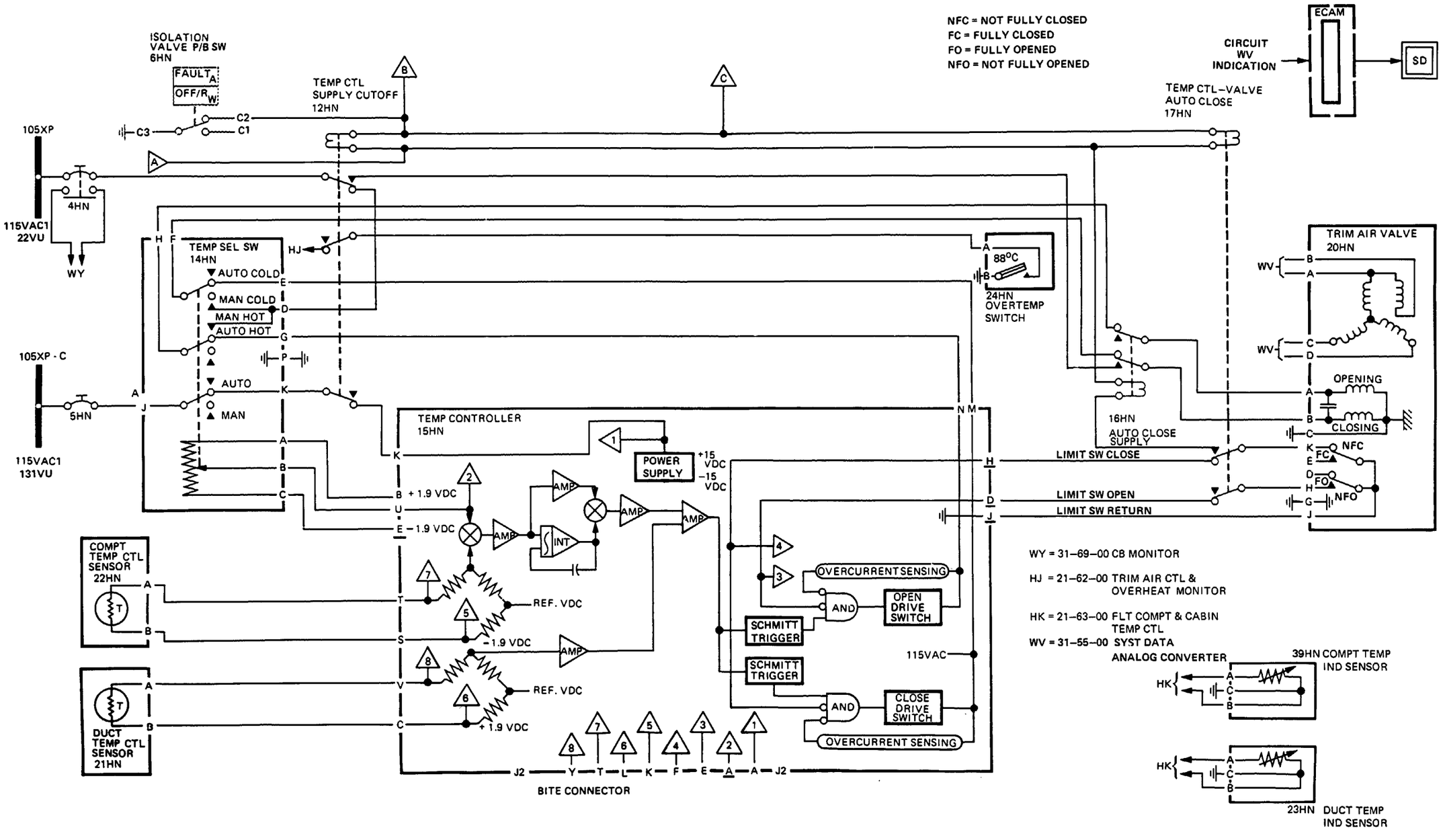

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Cargo Compt Temperature Control - Schematic
Figure 013

C. System Deactivation

(1)Normal

Cargo compartment temperature control system deactiviation is normally accomplished on COMPT TEMP panel 437VU by releasing the BULK CARGO/ISOL VALVE pushbutton switch 6HN completing the ground return for temp control system relays - supply cutoff 12HN and - valve auto close 17HN.
Energizing the temp control supply cutoff relay 12HN results in the following:

- 115 V AC from busbar 105XP-C supplied to temp controller 15HN is switched off,
- 115 V AC from busbar 105XP supplied to MAN control input of temperature selector switch 14HN on COMPT TEMP panel 437VU is switched over to supply power to close the trim air valve 20HN as required through the auto close supply relay 16HN.

Energizing the temp control - valve auto close relay 17HN results in the following:

- trim air valve limit switches are disconnected from the temperature controller 15HN,
- 28 V DC from busbar 303PP is switched through auto close supply relay 16HN to the close command position of the trim air valve limit switch. When the trim air valve 20HN is not closed, the actuator close command position is switched to supply the auto close supply relay 16HN with a ground return via the BULK CARGO temp controller ground.

(2)Overtemperature Deactivation

If the inlet duct temperature for BULK CARGO compartment reaches 88°C (190°F), the overtemp switch 24HN gives a ground to complete the overheat monitor circuit - energizes a relay, closes the trim air pressure control valve 11HJ (Ref. 21-62-00), and on COMPT TEMP 437VU, OVHT legend of the HOT AIR/SUPPLY pushbutton switch 4HJ comes on and provides indication on ECAM display system.
To supply trim air to compartments not affected by the overheat condition, accomplish the following on COMPT TEMP panel 437VU:

- release BULK CARGO/ISOL VALVE pushbutton switch 6HN to the OFF position,
- reset the HOT AIR/SUPPLY pushbutton switch 4HJ.

(3)Compartment Isolation/Smoke Detection Interface

Automatic activation of the temperature control relays 12HN and 17HN with the resultant shutdown of the BULK cargo compartment temperature control system is accomplished by any of the following:

- extraction fan 30HN malfunction,
- isolation valve 19HN malfunction,
- smoke detection system activation (Ref. 26-16-00).

(a)Extraction Fan Malfunction

If the fan motor stator temperature rises to a temperature of 90°C (194°F), internal thermo switches open to de-energize fan power relay 31HN, resulting in isolation of the fan power and rectifier 13HN power supply. The extract fan monitor relay 34HN closes a ground return to the temp control relays 12HN and 17HN therefore de-energizing the system. A second temp control relay ground return will occur at the fan fault detect relay 32HN, energized after a three (3) second operation

delay and indicated through **BULK/CARGO MFA 8HN** on maintenance panel **472VU:**

(b)Isolation Valve Malfunction

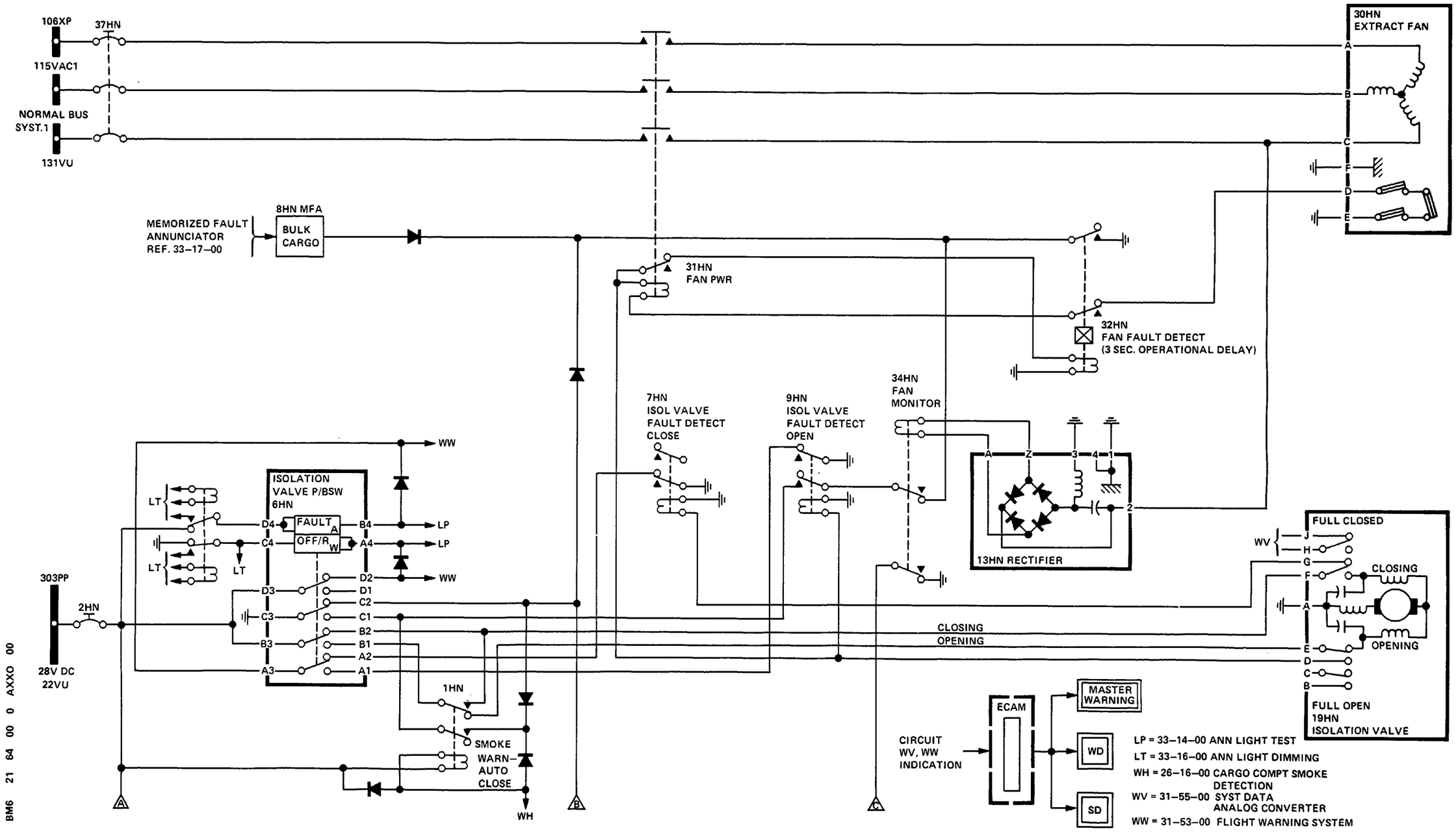
When the **BULK CARGO/ISOL VALVE** pushbutton switch **6HN** is pressed in on **COMPT TEMP** panel **437VU** and the isolation valve **19HN** fails in the closed position, the temp control relays **12HN** and **17HN** remain energized through the ground return at the fan monitor relay **34HN.**

R **ON A/C 001-100,

(Ref. Fig. 014)

R **ON A/C 101-200,

(Ref. Fig. 015)



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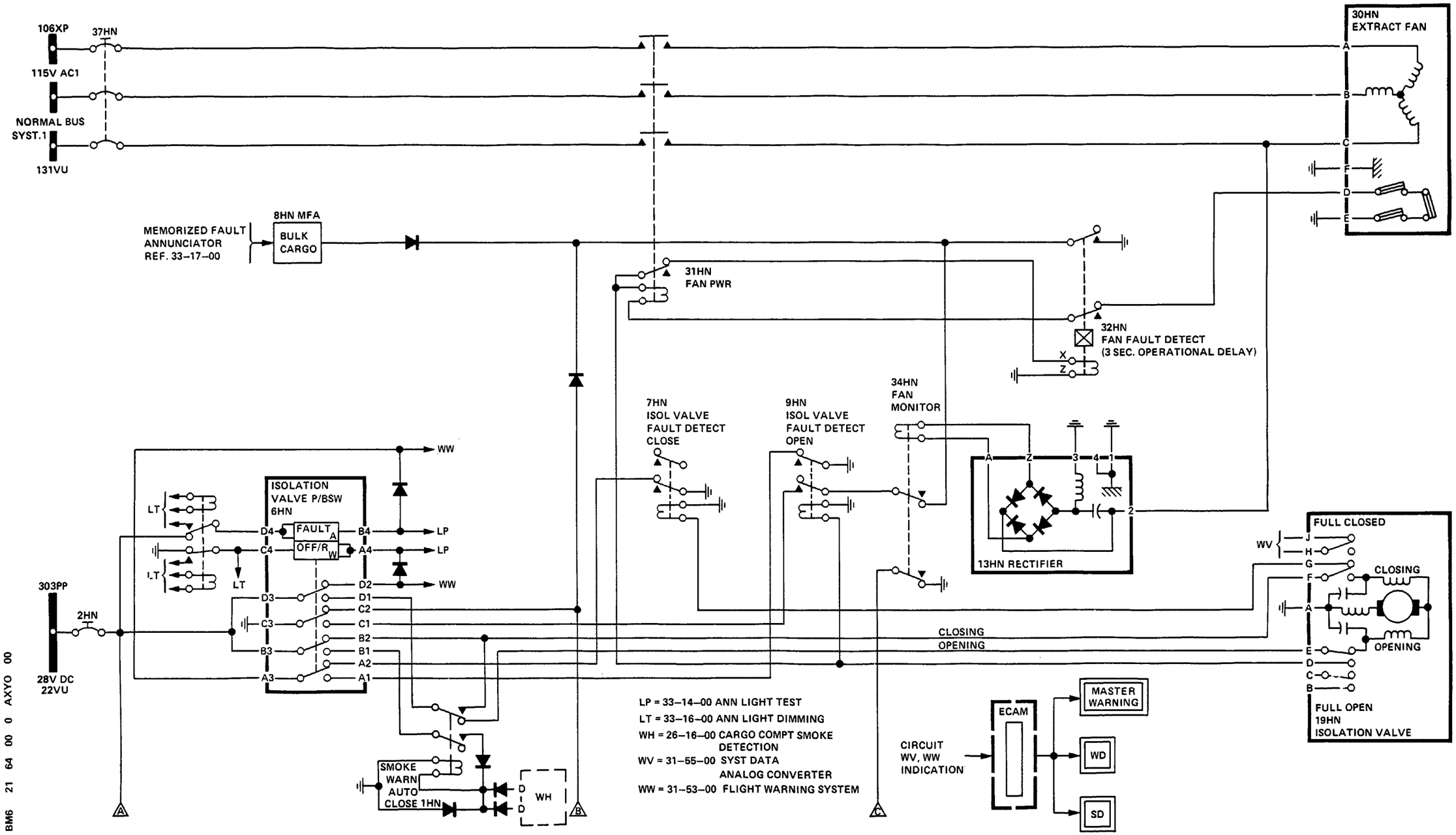
Cargo Compartment Ventilation - Schematic
Figure 014



Cargo Compartment Ventilation - Schematic
Figure 015

R **ON A/C 001-100,

(c)Smoke Detection System Interface
Activation of the cargo compt smoke detection system, indicated and controlled on **CARGO COMPT SMOKE DET** panel **433VU (Ref. 26-16-00)**, results in deactivation of the cargo compt temp control system by energizing smoke warn-auto close relay **1HN** with the following results:
- a ground return is supplied through the **ISOL VALVE** pushbutton switch **6HN** on **COMPT TEMP** panel **437VU** to smoke warn-auto close relay **1HN** hold-in circuit,
- closing circuit of isol valve **19HN** energizes,
- isol valve fault detect relay **7HN** will de-energize,
- on **COMPT TEMP** panel **437VU**, **FAULT** legend of **ISOL VALVE** pushbutton switch **6HN** comes on when isolation valve **19HN** closes and remains on when fully closed,
- isol valve fault detect relay **7HN** is energized,
- **R ECAM** display - **AIR COND** page comes on with the closed isolation valve, color: amber,
- fan power relay **31HN** de-energizes and isolates three phase supply to extract fan **30HN**,
- extract fan stops running,
- temp control supply cutoff relay **12HN** energizes and isolates temp controller **15HN**,
- temp control - valve auto close relay **17HN** energizes and isolates opening circuit of trim air valve **20HN**,
- auto close supply relay **16HN** energizes and closes trim air valve **20HN**,
- on **R ECAM** display - **AIR COND** page, trim air valve flap position arrow moves to position **C**,
- on **L ECAM** display, **SMOKE** and **AIR** warning of the relevant cargo compartment appears,
- temp control system is deactivated,
- to reset the temp control system, **ISOL VALVE** pushbutton switch **6HN** must be released **OFF** on **COMPT TEMP** panel **437VU**.

R **ON A/C 101-200,

(c)Smoke Detection System Interface
Activation of cargo compt smoke detection system, indicated and controlled on **CARGO COMPT SMOKE DET** panel **433VU (Ref. 26-16-00)**, results in deactivation of cargo compt temp control system by energized smoke warn-auto close relay **1HN** with the following results:
- isolating of power supply to isol valve **19HN** opening circuit,
- closing circuit of isol valve **19HN** energizes,
- isol valve fault detect relay **7HN** will de-energize,
- on **COMPT TEMP** panel **437VU**, **FAULT** legend of **ISOL VALVE** pushbutton switch **6HN** comes on when isolation valve **19HN** closes and remains on when fully closed,
- isol valve fault detect relay **7HN** is energized,
- **R ECAM** display - **AIR COND** page comes on with the closed isolation

valve, color: amber,
- fan power relay 31HN de-energizes and isolates three phase supply to extraction fan 30HN,
- extraction fan stops running,
- temp ctl supply cutoff relay 12HN energizes and isolates temp controller 15HN,
- temp ctl-valve auto close relay 17HN energizes and isolates opening circuit of trim air valve 20HN,
- auto close supply relay 16HN energizes and closes trim air valve 20HN,
- on R ECAM display - AIR COND page, trim air valve flap positon arrow moves to position C,

R
- on L ECAM display, SMOKE and AIR warning of the BULK cargo compartment appears,
- temp control system is deactivated,
- to reset the temp control system, ISOL VALVE pushbutton switch 6HN must be released OFF on COMPT TEMP panel 437VU.

CARGO COMPARTMENT TEMPERATURE CONTROL - SERVICING

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : USE EXTREME CARE WHEN WORKING WITH CLEANING AGENT No. 11-002. THE SOLVENT VAPORS ARE TOXIC AND FLAMMABLE. MAKE CERTAIN THAT WORKING AREA IS WELL VENTILATED. DO NOT INHALE FUMES, MIST OR DUST. PROTECT EYES AND SKIN. APPLY ONLY IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS. FIRE PROTECTION REGULATIONS MUST BE OBSERVED.

1. Reason for the Job

Cleaning of air inlet grills, suction lines, housings.
Bulk Cargo Compartment Compartment Temperature Monitors 22HN, 39HN.
Bulk Cargo Compartment Duct Temperature Monitors 21HN, 23HN, 24HN.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Vacuum Cleaner
B.	Torque Wrench - 0.4 m.daN (35.4 lbf. in.)
C.	Torque Wrench - 1.5 m.daN (119 lbf. in.)
D.	Corrosion Resistant Steel Lockwire 0.63 mm (0.025 in.)
E.	O-Rings
F.	Blanking Caps
G.	Warning Notices
H. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)

Referenced Procedures

- 21-64-11, P. Block 401	Duct Temperature Monitor
- 21-64-12, P. Block 401	Compartment Temperature Monitor
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors
R - 25-56-11, P. Block 201	BULK Cargo Compartment Linings

3. Procedure

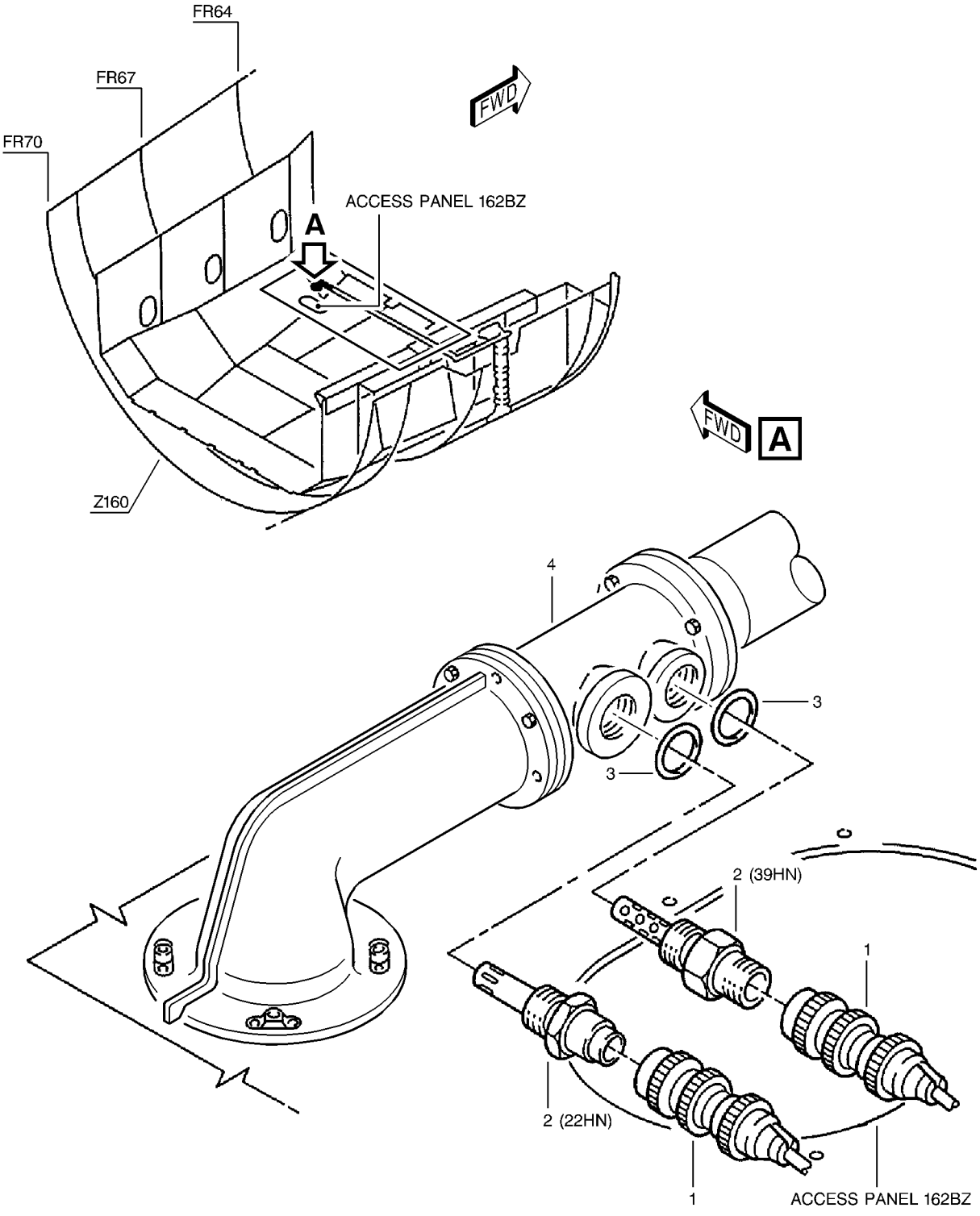
(Ref. Fig. 301)
(Ref. Fig. 302)

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

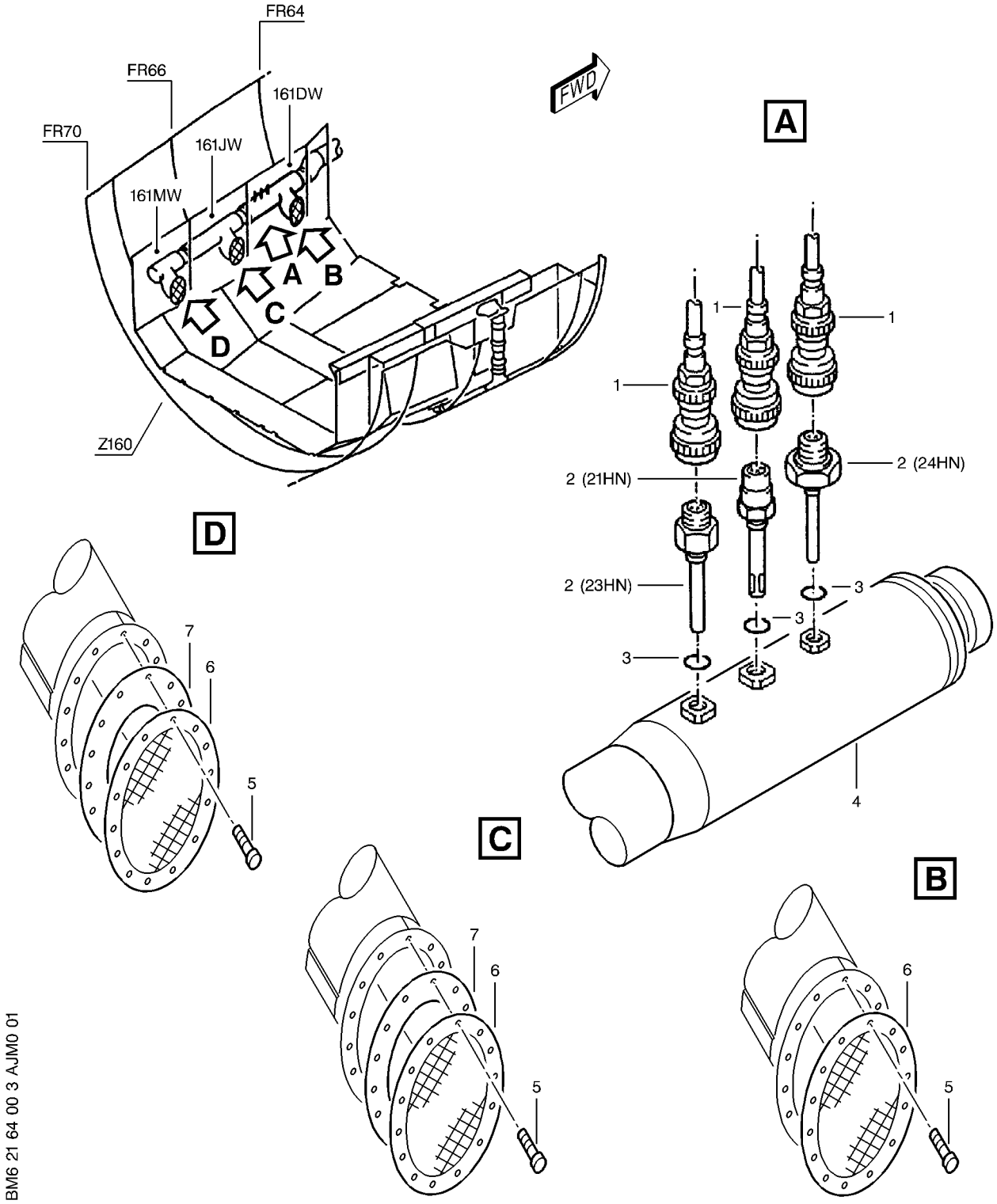
PANEL	SERVICE	IDENT.	LOCATION
131VU	CARGO/BULK/AUTO CTL	5HN	D55
131VU	TEMP IND	54HK	H58

(2)Display warning notices prohibiting operation of air-conditioning system.
(3)Position access platform.
(4)Open BULK cargo compartment door 813 (Ref. 52-30-00, P. Block 301).
(5)Remove sidewall panel 161DW or ceiling panel 162BZ as required



BULK Cargo Compartment Temperature Monitors
Figure 301

R



BULK Cargo Compartment Duct Temperature Monitors
Figure 302

R

R (Ref. 25-56-11, P. Block 201).
R (6)Remove sidewall panel 161JW and 161MW if necessary (Ref. 25-56-11,
R P. Block 201).

B. Removal of all Temperature Monitors
(1)Disconnect electrical connector (1).
(2)Remove and discard lockwire.
(3)Unscrew and remove temperature monitor (2).
(4)Remove and discard O-ring (3).
(5)Fit blanking caps to monitor mounting base and electrical connector.

WARNING : USE EXTREME CARE WHEN WORKING WITH CLEANING AGENT No. 11-002. THE SOLVENT VAPORS ARE TOXIC AND FLAMMABLE. MAKE CERTAIN THAT WORKING AREA IS WELL VENTILATED. DO NOT INHALE FUMES, MIST OR DUST. PROTECT EYES AND SKIN. APPLY ONLY IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS. FIRE PROTECTION REGULATIONS MUST BE OBSERVED.

CAUTION : DO NOT IMMERSE TEMPERATURE MONITORS IN THE CLEANING FLUID.

R C. Removal of Air Inlet Grills and Restrictors (if necessary)
R (1)Remove screws (5).
R (2)Remove air inlet grills (6) and restrictors (7).

R D. Cleaning
(1)Blow compressed air through ducts and clean with brush.
R (2)Clean air inlet grills (6) with vacuum cleaner and brush.
R (3)Clean monitor mounting base (4).
R (4)Clean temperature monitors (2) with a cleaning solvent (Ref. Mat. No. 11-002) and a lint free cloth.

R E. Installation of all Temperature Monitors
(1)Remove blanking caps and check for correct condition of monitor mounting base and electrical connector.
(2)Install new O-ring (3) on monitor.
(3)Install monitor (2) in housing and tighten.
(4)TORQUE monitor to the values given below:
(a)Monitors 21HN, 24HN, 62HN, 65HN TORQUE to between 0.300 - 0.325 m. daN (26.55 and 28.76 lbf.in.).
(b)Monitors 23HN and 67HN TORQUE to between 0.300 - 0.365 m. daN. (26.55 - 32.31 lbf. in.).
(c)Monitors 22HN and 63HN TORQUE to between 0.3 - 1.00 m. daN. (26.55 - 88.51 lbf. in.).
(d)Monitors 39HN and 66HN TORQUE to between 0.3 - 1.35 m. daN. (26.55 - 119 lbf. in.).
(5)Secure monitor with lockwire.
(6)Connect electrical connector.

R F. Installation of Air Inlet Grills and Restrictors (if removed)
R (1)Install air inlet grills (6) and restrictors (7).
R (2)Install screws (5).

R G. Test
(1)Carry out operational tests (Ref. 21-64-11, P. Block 401) and (Ref. 21-64-12, P. Block 401).

R H. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Install sidewall panel 161DW or access panel 162BZ as removed
R (Ref. 25-56-11, P. Block 201).
R (3)Install sidewall panel 161JW and 161MW if removed (Ref. 25-56-11,
R P. Block 201).
R (4)Close BULK Cargo Compartment door 813 (Ref. 52-30-00, P. Block 301).
R (5)De-energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
R (6)Restore system and aircraft to normal operating condition.
R (7)Remove warning notices.

1. Operational Test

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

A. Reason for the Job

(1)To check operation of the cargo compartment temperature control system and interface with smoke detection system.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz

Referenced Procedures

- 24-41-00, P. Block 301	AC External Power Control
- 33-17-00, P. Block 501	Memorized Fault Annunciators
- 31-51-00, P. Block 201	ECAM Sxstem

C. Procedure

(1)Job Set-Up

(a)Connect electrical ground power unit and energize aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that electronics racks ventilation is correct.

(c)Make certain that the following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
R **ON A/C 001-100,			
22VU	CARGO/SMOKE DET/WARN	46WH	A25
22VU	CARGO/SMOKE DET/PWR/SUPPLY	35WH	A26
22VU	AVIONICS/SMOKE DET/DETECTORS	2WA	F24
22VU	AVIONICS/SMOKE DET/DETECTORS	1WA	F25
22VU	COMPT TEMP/CARGO/ISOL/VALVES BULK	2HN	G28
R **ON A/C 101-200,			
22VU	AVIONICS/SMOKE DET/DETECTORS	2WA	F24
22VU	AVIONICS/SMOKE DET/DETECTORS	1WA	F25
22VU	COMPT TEMP/CARGO/ISOL/VALVES BULK	2HN	G28
R **ON A/C ALL			
131VU	AIR BLEED-COMPT TEMP/CARGO BULK/ AUTO/CTL	5HN	D55
131VU	AIR BLEED-COMPT TEMP/CARGO BULK/ MAN/CTL	4HN	D56
131VU	AIR BLEED-COMPT TEMP/CARGO COMPT/ EXTRACT FANS/BULK	37HN	E57
131VU	AIR BLEED-COMPT TEMP/DEMAND/TEMP/CTL	7HH	F56
132VU	LIGHTING/MAINT PANEL/ANN & MFA	1WB	L78
132VU	LIGHTING/MAINT PANEL/ANN & MFA	22WB	L79
132VU	LIGHTING/INT LT/ANN LT/TEST/MAN	1LP	L80
132VU	LIGHTING/INT LT/ANN LT/TEST/MAN	2LP	L81
132VU	LIGHTING/INT LT/ANN LT/TEST/MAN	149LP	L82
132VU	LIGHTING/INT LT/ANN LT/TEST/AUTO	153LP	M83

(d)Start ECAM system (Ref.: 31-51-00, P. Block 201)

(e)Test FANS MONITOR MFAs (Ref. 33-17-00, P. Block 501).

(2)Test

(a)Test operation of BULK cargo compartment isolation valve 19HN, extraction fan 30HN, and FANS MONITOR MFA 8HN.

1 Initial conditions:

On COMPT TEMP panel 437VU:

- BULK CARGO temperature selector switch 14HN is in MAN position.
- BULK CARGO/ISOL VALVE pushbutton switch 6HN is released OFF.

On maintenance panel 472VU:

- ANN LT toggle switch 2WB is in READ position.

2 Perform test.

ACTION	RESULT
1. On COMPT TEMP panel 437VU: - press ISOL VALVE pushbutton switch 6HN.	On COMPT TEMP panel 437VU: - OFF/R legend goes off. - for duration of isolation valve flap movement, ISOL VALVE pushbutton switch FAULT legend comes on and then goes off. On R ECAM display - AIR COND page: - isolation valve opens, - isolation valve color: green. On maintenance panel 472VU: - check that BULK/CARGO MFA does not come on.
- rotate and hold BULK CARGO temperatur selector switch 14HN to MAN-HOT position until trim air valve flap position arrow, on R ECAM display - AIR COND page, is between H and C, then release selector switch.	On R ECAM display - AIR COND page: - trim air valve flap position arrow remains stationary.
2. On circuit breaker panel 131VU: - at location E57 open circuit breaker 37HN.	On R ECAM display - AIR COND page: - trim air valve flap position arrow moves to C. On maintenance panel 472VU: - BULK/CARGO MFA comes on.
- close circuit breaker 37HN.	- BULK/CARGO MFA remains on.
3. On maintenance panel 472VU: - press MFA RESET pushbutton switch 20WB.	- BULK/CARGO MFA goes off.
4. On COMPT TEMP panel 437VU: - release ISOL VALVE pushbutton switch 6HN.	On COMPT TEMP panel 437VU: - OFF/R legend comes on. - for duration of isolation valve flap movement, ISOL VALVE pushbutton switch FAULT legend comes on and then goes off. On R ECAM display - AIR COND page: - isolation valve closed, - isolation valve color: amber. On maintenance panel 472VU: - check that BULK/CARGO MFA does not come on.

(b)Carry out BITE-Test for cargo compartment temperature control system.
NOTE : Test equipment is located in avionics compartment at equipment rack 91VU.
1 Initial condition:
On COMPT TEMP panel 437VU:
R - PACK VALVE 1 and 2 pushbutton switches 191HB and 189HB are
R pressed in.
- BULK CARGO/ISOL VALVE pushbutton switch 6HN is pressed in.
- BULK CARGO temperature selector switch 14HN is in AUTO position.
R - HOT AIR SUPPLY pushbutton switch 4HJ is pressed in.
2 Perform test.

ACTION	RESULT
1. At rack 91VU, on APU and pack temp demand controller 37HK: - check that electrical power is available at APU and pack temp demand controller by pressing BITE READY/UNPLUG CABLE AFTER USE light, - make certain that BITE SWITCH is in position 1.	On APU and pack temp demand controller 37HK: - light comes on when pressed.
2. On circuit breaker panel 131VU: - at location D55 open circuit breaker 5HN.	
3. On BULK CARGO compt temp controller 15HN: - remove BITE connector protective cap. - connect test cable of APU and pack temperature demand controller 37HK to BITE connector.	
4. On circuit breaker panel 131VU: - at location D55 close circuit breaker 5HN.	On APU and pack temp demand controller: - BITE READY/UNPLUG CABLE AFTER USE and GO indicator lights come on.
5. On APU and pack temperature demand controller: - press NO GO indicator light. - place BITE SWITCH to positions 1 thru 12 in sequence, pausing at each position until either GO or NO GO light comes on. R NOTE : A NO GO light shows a failure R in the cargo compartment R temperature control system.	On APU and pack temperature demand controller: - NO GO integral light comes on. - for each position selected, GO indicator light must come on.

ACTION	RESULT

NOTE : Position 1 - Sum of outputs of pack scaling amplifiers is checked.
Position 2 - APU speed demand signal for maximum cooling is checked.
Position 3 - APU speed demand signal for maximum heating is checked.
Position 4 - Bridge power supply is checked.
Position 5 - Amplifier output is checked.
Position 6 - Drives actuator in more heat direction.
Position 7 - Overrides bridge output with signal to produce maximum cooling output.
Position 8 - Overrides bridge output with signal to produce maximum heating output.
Position 9 - Overrides bridge output to produce a 'nulled' output.
Position 10 - Output of bridge is checked.
Position 11 - Output of bridge is checked.
Position 12 - Selector output signal is checked.

- return BITE SWITCH to position 1.

6. On circuit breaker panel 131VU:
   - at location D55 open circuit breaker 5HN.

On APU and pack temperature demand controller:
- BITE READY/UNPLUG CABLE AFTER USE and GO indicator lights go off.

7. On BULK CARGO compt temp controller 15HN:
   - disconnect test cable and secure to dummy connector 103VC.
   - secure protective cap.

8. On circuit breaker panel 131VU:
   - at location D55 close circuit breaker 5HN.

(c)Not applicable.

**ON A/C 101-200,

(d)Test operation of BULK cargo compartment isolation valve 19HN, trim air valve 20HN and extraction fan 30HN when SMOKE warning is simulated.
1 Initial conditions:
On COMPT TEMP panel 437VU:
- BULK CARGO temperature selector switch 14HN is in MAN position.
- BULK CARGO/ISOL VALVE pushbutton switch 6HN is pressed in.
On maintenance panel 472VU:
- ANN LT toggle switch 2WB is in READ position.
2 Perform test.

**ON A/C 001-100,

(d)Test operation of BULK cargo compartment isolation valve 19HN, trim air valve 20HN and extraction fan 30HN when SMOKE warning is simulated.

1 Initial conditions:

On COMPT TEMP panel 437VU:
- BULK CARGO temperature selector switch 14HN is in MAN position.
- BULK CARGO/ISOL VALVE pushbutton switch 6HN is pressed in.

On maintenance panel 472VU:
- ANN LT toggle switch 2WB is in READ position.

On CARGO COMPT SMOKE DET panel 433VU:
- AFT/LOOP A 23WH, AFT/LOOP B 24WH, BULK/LOOP A 25WH and BULK /LOOP B 26WH pushbutton switches are pressed in.

2 Perform test.

ACTION	RESULT
1. On CARGO COMPT SMOKE DET panel 433VU: - release BULK/LOOP B push-button switch 26WH.	On CARGO COMPT SMOKE DET panel 433VU: - OFF legend comes on. On main instrument panels 3VU and 5VU: - MASTER/CAUTION lights come on. In flight compartment: - single chime sounds. On L ECAM display: LOOP BULK COMPT LOOP B OFF appears.
2. On COMPT TEMP panel 437VU: - rotate BULK CARGO temperature selector switch 14HN to MAN - HOT position, hold until trim air valve flap position arrow, on R ECAM display - AIR COND page, is at H, then release selector switch.	On R ECAM display - AIR COND page: - trim air valve flap position arrow remains stationary at H, color: green.
3. On maintenance panel 471VU: - rotate ELEC COMPT & CARGO COMPT selector switch 16WA to CARGO COMPT/BULK position. - place CARGO COMPT/LOOP TEST SEL toggle switch 48WH to LOOP A position.	On maintenance panel 471VU: - TEST legend of PTT pushbutton switch 52WA comes on.

ACTION	RESULT
4. On maintenance panel 471VU:	On CARGO COMPT SMOKE DET panel 433VU:
- press and hold PTT pushbutton switch 52WA.	- BULK/SMOKE red warning light 12WH and LOOP A legend 25WH come on. In flight compartment: - repetitive chime sounds. On main instrument panels 3VU and 5VU: - MASTER/WARNING lights flash. On COMPT TEMP panel 437VU: - BULK CARGO/ISOL VALVE pushbutton switch 6HN FAULT legend comes on. On R ECAM display - AIR COND page: - isolation valve closes and color changes to amber. - trim air valve flap position arrow moves to position C. On L ECAM display: SMOKE BULK CARGO COMPT SMOKE - AGENT 1 - DISCH - LDG ELEVATION - 10,000 FT appears.
- release PTT pushbutton switch.	On CARGO COMPT SMOKE DET panel 433VU: - BULK/SMOKE red warning light and LOOP A legend go off. On main instrument panels 3VU and 5VU: - MASTER/WARNING lights go off. In flight compartment: - repetitive chime stops. On L ECAM display: SMOKE BULK CARGO COMPT SMOKE - AGENT 1 - DISCH - LDG ELEVATION - 10,000 FT disappears.
5. On COMPT TEMP panel 437VU: - reset BULK CARGO/ISOL VALVE push-button switch 6HN (Release p/b sw and press again).	On COMPT TEMP panel 437VU: - after isolation valve opens, ISOL VALVE pushbutton switch FAULT legend goes off. On R ECAM display - AIR COND page: - isolation valve opens and color changes to green. - trim air valve flap position arrow remains at position C.

ACTION	RESULT
6. On maintenance panel 471VU: - rotate ELEC COMPT & CARGO COMPT selector switch 16WA to NORM/FLT position.	On maintenance panel 471VU: - TEST legend of PTT pushbutton switch 52WA goes off.
7. On CARGO COMPT SMOKE DET panel 433VU: - press BULK/LOOP B pushbutton switch 26WH.	On CARGO COMPT SMOKE DET panel 433VU: - OFF legend goes off. On main instrument panels 3VU and 5VU: - MASTER/CAUTION lights go off. On L ECAM display: LOOP BULK COMPT LOOP B OFF disappears.

R **ON A/C 101-200,

ACTION	RESULT
1. On COMPT TEMP panel 437VU: - rotate and hold BULK CARGO temp selector switch 14HN in MAN-HOT position, until trim air valve flap position arrow, on R ECAM display - AIR COND page, is at H, then release selector switch.	On R ECAM display - AIR COND page: - trim air valve flap position arrow remains stationary at H, color: green
2. On maintenance panel 471VU: - rotate ELEC COMPT & CARGO COMPT selector switch 16WA to CARGO COMPT/BULK/1 position. - press and hold PTT pushbutton switch 52WA.	On maintenance panel 471VU: - PTT pushbutton switch 52WA TEST legend comes on. On CARGO COMPT SMOKE DET panel 433VU, after approx. 2 - 3 second delay: - AFT & BULK/SMOKE red warning light 38WH comes on. On main instrument panels 3VU and 5VU, after 2 - 3 second delay: - MASTER/WARNING lights flash. In flight compartment: - repetitive chime sounds.

ACTION	RESULT
	On COMPT TEMP panel 437VU: - BULK CARGO/ISOL VALVE pushbutton switch 6HN FAULT legend comes on. On R ECAM display - AIR COND page: - isolation valve closes and color changes to amber. - trim air valve flap position arrow moves to position C. On L ECAM display: SMOKE AFT & BULK CARGO COMPT SMOKE - AGENT 1 - DISCH - LDG ELEVATION - 10,000 FT appears.
R - release PTT pushbutton switch.	On CARGO COMPT SMOKE DET panel 433VU: - AFT & BULK/SMOKE red warning light goes off. In flight compartment: - repetitive chime stops. On main instrument panels 3VU and 5VU: - MASTER/WARNING lights go off. On L ECAM display: SMOKE AFT & BULK CARGO COMPT SMOKE - AGENT 1 - DISCH - LDG ELEVATION - 10,000 FT disappears.
3. On COMPT TEMP panel 437VU: - reset BULK CARGO/ISOL VALVE push-button switch 6HN.	On COMPT TEMP panel 437VU: - after isolation valve opens, ISOL VALVE pushbutton switch FAULT legend goes off. On R ECAM display - AIR COND page: - isolation valve opens and color changes to green. - trim air valve flap position arrow remains at position C.
4. On maintenance panel 471VU: - rotate ELEC COMPT & CARGO COMPT selector switch 16WA to NORM/FLT position.	On maintenance panel 471VU: - PTT pushbutton switch 52WA TEST legend goes off.

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(3)Close-Up
  (a)On maintenance panel 472VU, place ANN LT toggle switch 2WB in OFF position.
  (b)On ECAM control panel, release ECAM SGU 1 and 2 pushbutton switches.
  (c)On COMPT TEMP panel 437VU, rotate BULK CARGO temperature selector switch 14HN to AUTO position.
  (d)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
  (e)De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

R DUCT TEMPERATURE MONITORS - REMOVAL/INSTALLATION

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz
B.	Access Platform, 2.3 m (7.5 ft.)
C.	Torque Wrench, up to 0.4 m.daN (35.4 lbf.in.)
D.	Blanking Plugs and Caps
E.	Circuit Breaker Safety Clips
F.	Warning Notice
G.	O-Rings
H.	Corrosion-Resistant Steel Lockwire, 0.63 mm (0.025 in.) dia.

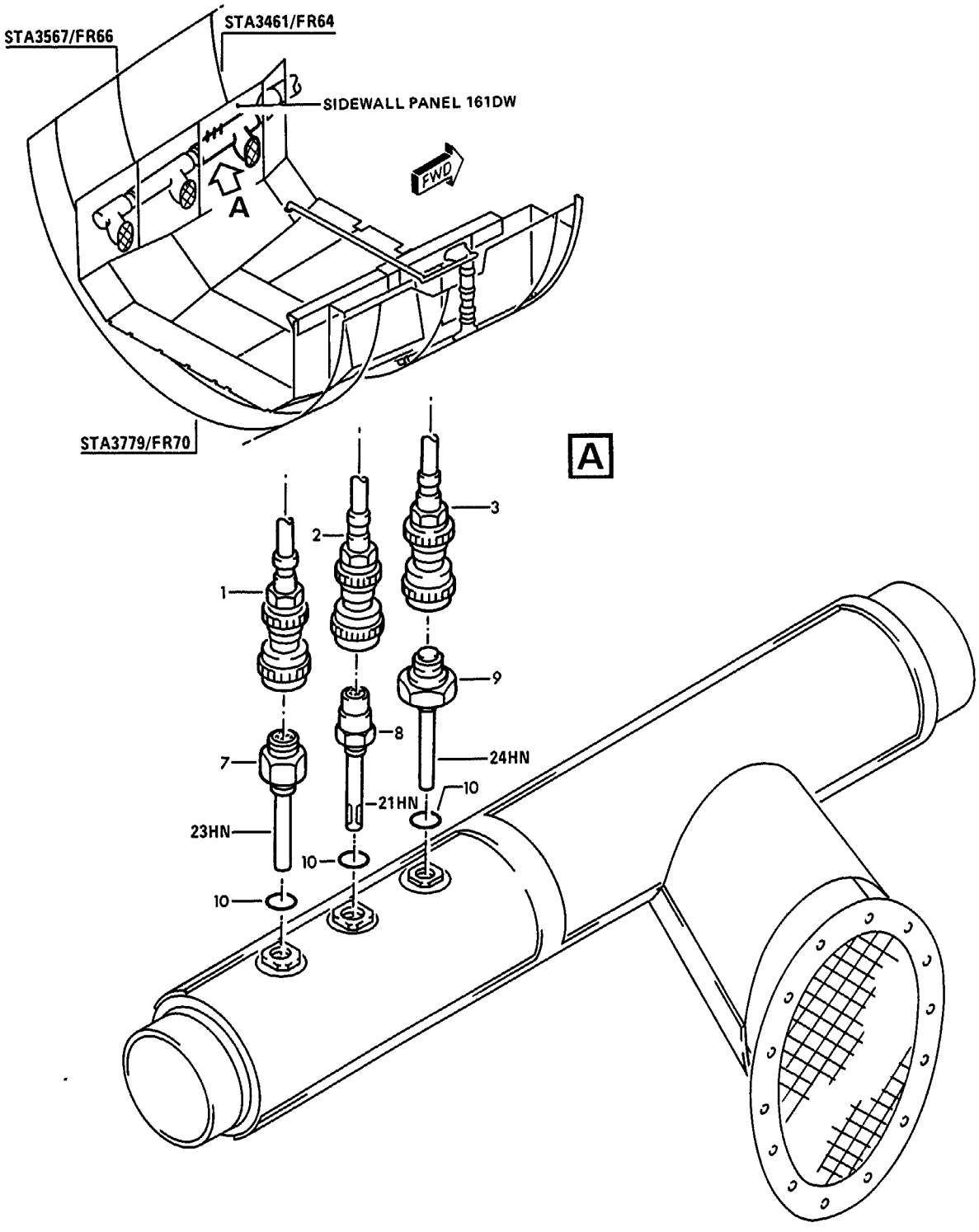
Referenced Procedures

- 21-64-00, P. Block 501	Cargo Compartment Temperature Control
- 24-41-00, P. Block 301	AC External Power Control

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP/CARGO/BULK/AUTO CTL (For Duct Temp. Sensor 21HN)	5HN	D55
131VU	COMPT TEMP/HOT AIR SUPPLY/WARN (For Overtemp. Switches)	1HJ	H57
131VU	COMPT TEMP/TEMP IND (For Duct Temp. Ind. Sensors)	54HK	H58



BULK Cargo Duct Temperature Monitors
Figure 401

(2)Display warning notice, prohibiting operation of air-conditioning system.
(3)Position access platform.
(4)Open BULK cargo compartment door 813.
(5)Remove LH sidewall panel 161DW.

B. Removal

(1)Disconnect electrical connectors 21HN-A (2), 23HN-A (1) and 24HN-A (3).
(2)Cut and remove lockwire and remove the following items:
Duct Temperature Sensor, 21HN (8)
Duct Temperature Indicator Sensor, 23HN (7)
Overtemperature Switch, 24HN (9).
(3)Discard O-rings (10).
(4)Blank off apertures of removed switches and sensors and cap electrical connectors.

C. Installation

(1)Remove blanking caps and plugs, and check for correct condition of apertures and electrical connectors.

(2)Install sensors and switches with new O-rings (10) and TORQUE to the following values:

ITEM	FIN	DESIGNATION	TORQUE VALUE
7	23HN	DUCT TEMP IND SENSOR	0.300-0.365 m.daN (26.55-32.31 lbf.in.)
8	21HN	DUCT TEMP CTL SENSOR	0.300-0.325 m.daN (26.55-28.76 lbf.in.)
9	24HN	OVERTEMP SWITCH	0.300-0.325 m.daN (26.55-28.76 lbf.in.)

(3)Safety with lockwire.

(4)Connect electrical connectors 21HN-A (2), 23HN-A (1) and 24HN-A (3).

D. Test
(1) Remove safety clips and tags and close circuit breakers 1HJ, 5HN and 54HK, as required.
(2) Connect electrical ground power unit and energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3) Make certain that electronics racks ventilation is correct.
(4) Carry out BITE-Test of cargo compartment temperature control system as required and make certain that GO indicator light comes on, particularly with BITE SWITCH in position 10 (Ref. 21-64-00, P. Block 501).
(5) On COMPT TEMP panel 437VU, place COMPT/DUCT indicator selector switch 56HK to CARGO/BULK position as necessary and check that DUCT indicator denotes ambient air temperature. Return selector to CRT position.
(6) De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

E. Close-Up
(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2) Install sidewall panels 161DW.
(3) Close BULK cargo compartment door 813.
(4) Remove access platform.

COMPARTMENT TEMPERATURE MONITORS 22HN, 39HN - REMOVAL/INSTALLATION

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz
B.	Access Platform, 2.3 m (7.5 ft.)
C.	Torque Wrench, up to 1.5 m.daN (11.06 lbf.ft.)
D.	Blanking Plugs and Caps
E.	Circuit Breaker Safety Clips
F.	Warning Notice
G.	O-Rings
H.	Lockwire, Corrosion-Resistant Steel, 0.63 mm (0.025 in.) dia.

Referenced Procedures

- 21-64-00, P. Block 501	Cargo Compartment Temperature Control
- 24-41-00, P. Block 301	AC External Power Control

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers:

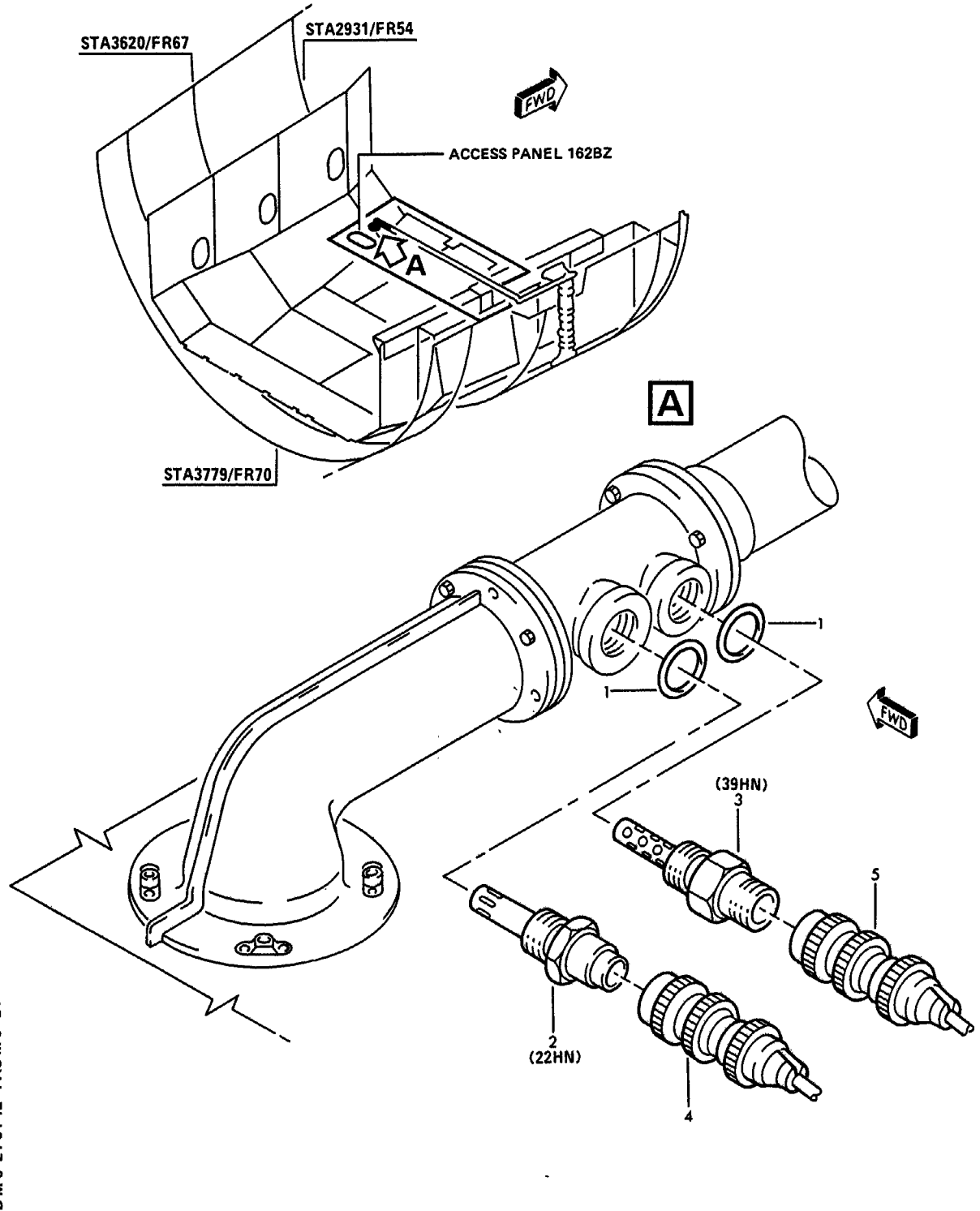
PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP-CARGO BULK AUTO CTL	5HN	D55
131VU	COMPT TEMP-TEMP IND	54HK	H58

(2)Display warning notice prohibiting operation of the air-conditioning system.

(3)Position access platform.

(4)Open BULK cargo compartment door 813.

(5)At RH ceiling panel between STA3620(FR67) and STA3673(FR68), remove access panel 162BZ, as required.



BULK Cargo Compartment Temperature Monitors
Figure 401

B. Removal
(1)Disconnect electrical connectors 22HN-A (4) and 39HN-A (5).
(2)Cut lockwire and remove the following items:
Temperature Control Sensor 22HN (2)
Temperature Indicator Sensor 39HN (3)
(3)Discard O-rings (1).
(4)Blank off apertures of removed sensors and cap electrical connectors.

C. Installation
(1)Remove blanking caps and plugs and check for correct condition of duct apertures, sensors and electrical connectors.
(2)Install sensors with new O-rings (1) and TORQUE to the following values:

	ITEM	FIN	DESIGNATION	TORQUE VALUE
R	2	22HN	TEMP. CONTROL SENSOR	0.3 - 1.00 m.daN (26.55 - 88.51 lbf.in.)
R	3	39HN	TEMP. IND. SENSOR	0.3 - 1.35 m.daN (26.55 - 119.48 lbf.in.)

(3)Safety with lockwire.
(4)Connect electrical connectors 22HN-A(4) and 39HN-A(5).

D. Test
(1) Remove safety clips and tags and close circuit breakers 5HN and 54HK as required.
(2) Connect electrical ground power unit and energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3) Make certain that electronics racks ventilation is correct.
(4) Carry out BITE-Test of cargo compartment control system as required and make certain that GO indicator light comes on, in particular with BITE switch in position 11 (Ref. 21-64-00, P. Block 501).
(5) On COMPT TEMP panel 437VU, place COMPT/DUCT indicator selector switch 56HK to CARGO/BULK position as necessary and check that COMPT indicator denotes ambient air temperature. Return selector to CRT position.
(6) De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

E. Close-Up
(1) Install access panel 162BZ.
(2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3) Close BULK cargo compartment door 813.
(4) Remove access platform.

CARGO COMPARTMENT TEMPERATURE CONTROLLER 54HN - REMOVAL/INSTALLATION

1. Equipment and Materials

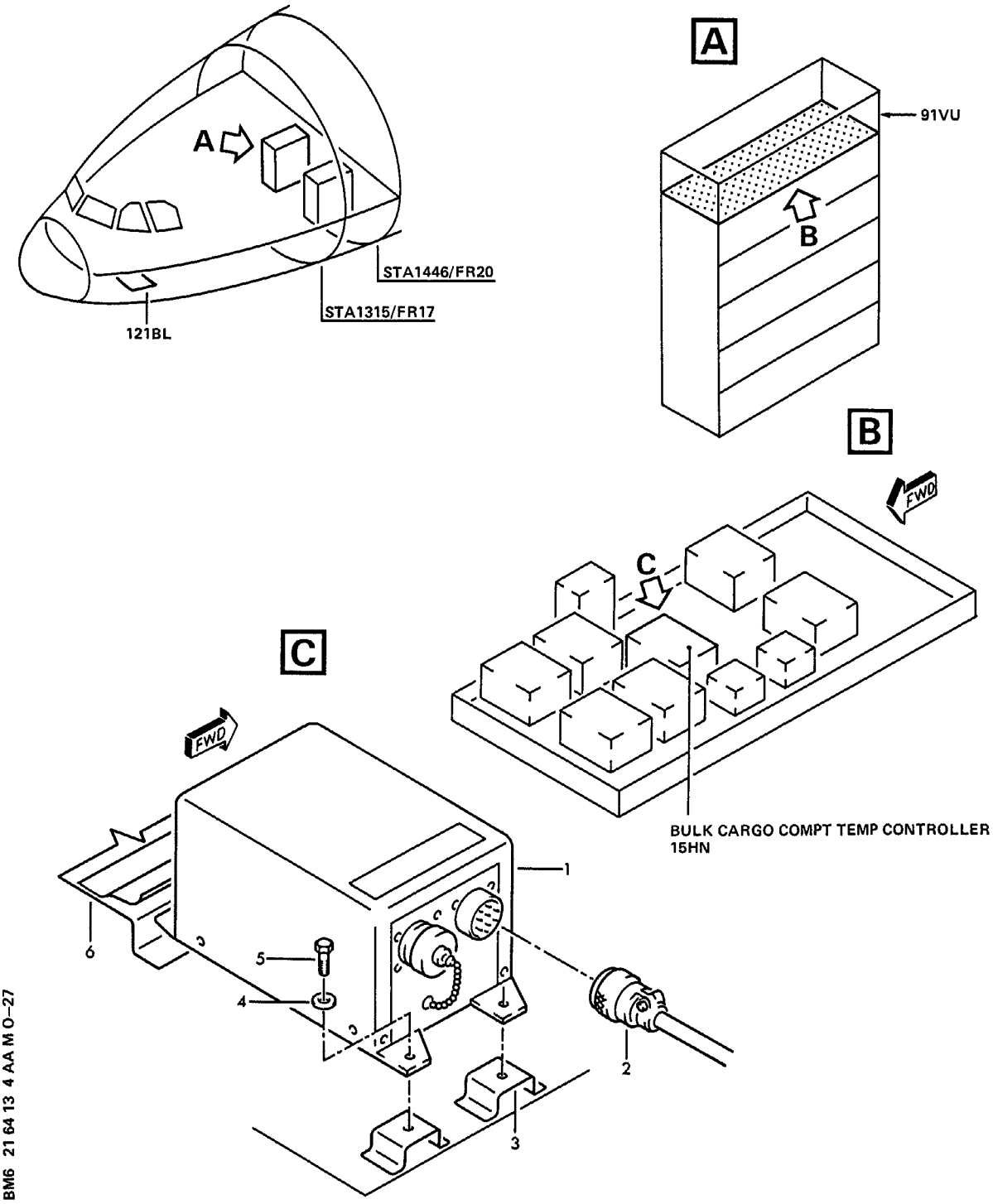
ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking Plugs/Caps
Referenced Procedure - 21-64-00, P. Block 501	Cargo Compartment Temperature Control

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMP TEMP - CARGO BULK AUTO CTL	5HN	D55
131VU	COMP TEMP - CARGO BULK MAN CTL	4HN	D56

(2)Open access door 121BL



Temperature Controller
Figure 401

B. Removal
(1)Disconnect electrical connector (2).
(2)Remove screws (5) and washers (4).
(3)Slightly lift front of controller (1) and free from rear attachment flange (6).
(4)Remove controller (1).
(5)Cap electrical connector (2).

C. Installation
(1)Clean and inspect controller interface and/or adjacent area.
(2)Remove blanking plug/cap and check for correct condition of electrical connector.
(3)Position controller (1) on its support (3).
(4)Insert controller rear attachment lugs in attachment flange (6).
(5)Install washers (4), install and tighten screws (5).
(6)Connect electrical connector.
(7)Remove safety clips and tags and close circuit breakers 4HN and 5HN.

D. Test
Carry out BITE - Test for cargo compartment temperature control system (Ref. 21-64-00, P. Block 501).

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 121BL.

CHECK VALVE 0518 - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON AIR-CONDITIONING SYSTEM MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURISED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.3 m (7.5 ft.)
B.	Warning Notice
C.	Blanking Caps
D.	O-Rings

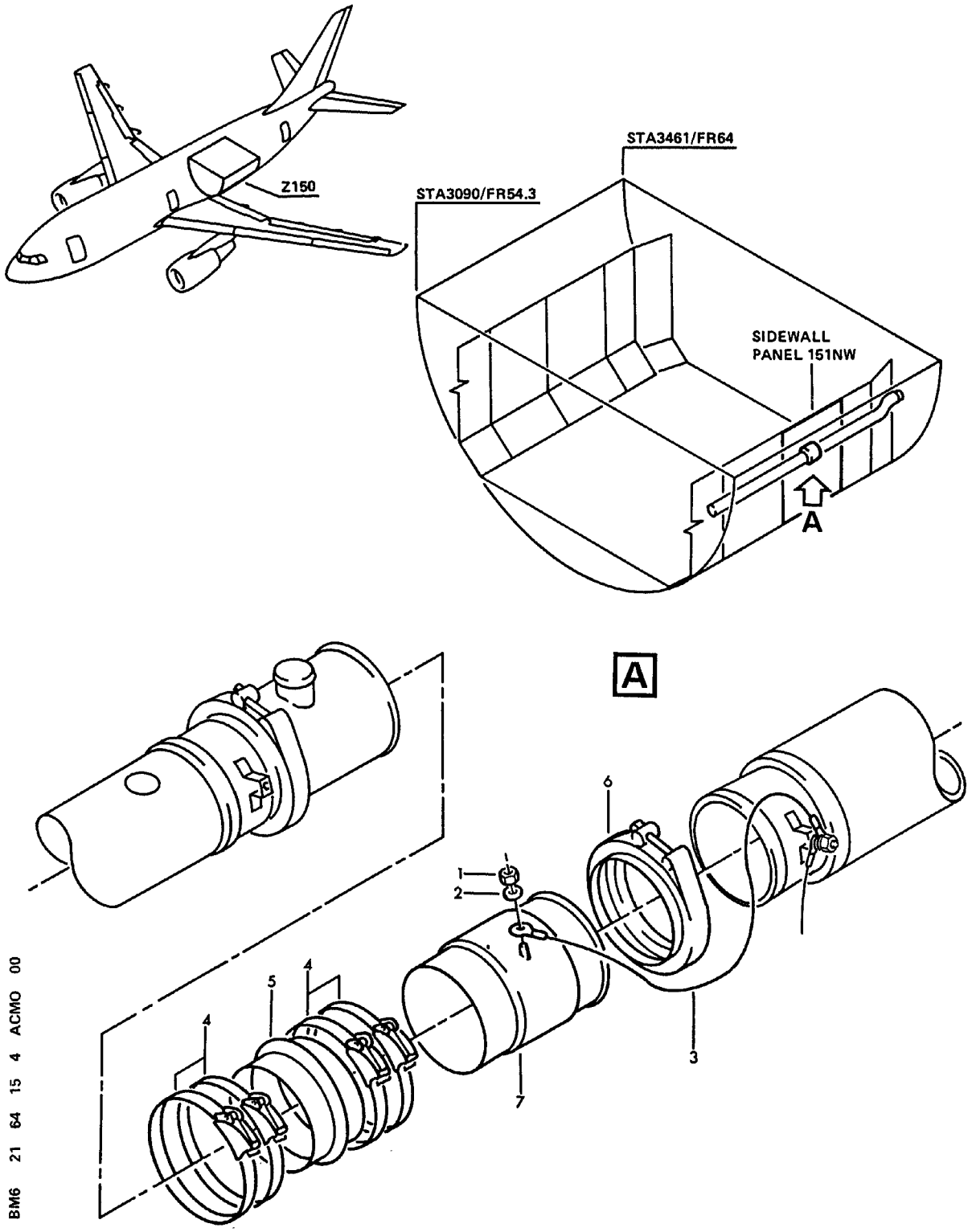
2. Procedure

A. Job Set-Up
(1)Display warning notice prohibiting operation of the air-conditioning system.
(2)Position access platform.
(3)Open BULK cargo compartment door 813.
(4)Remove sidewall panel 151NW.

B. Removal
(1)Not applicable
(2)Removal of check valve in BULK cargo compartment (Ref. Fig. 401).
(a)Remove nut (1), washer (2) and bonding strap (3).
(b)Remove clamps (4) and free bellows (5).
(c)Remove clamp (6) and check valve (7).
(d)Fit blanking caps to open ends of duct.

C. Installation
(2)Installation of check valve in BULK cargo compartment (Ref. Fig. 401)
(a)Remove blanking caps.
(b)Position check valve (7) and install clamp (6).
NOTE : Make certain that flow direction arrow is pointing rearwards.
(c)Position bellows (5) and install clamps (4).
(d)Install bonding strap (3), washer (2) and nut (1).

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Install sidewall panel 151NW.
(3)Close Bulk cargo compartment door 813.
(4)Remove warning notice.
(5)Remove access platform.



Check Valve 0518
Figure 401

TRIM AIR VALVE 20HN - REMOVAL/INSTALLATION

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WARNING : ALLOW HOT AIR VALVE AND ADJOINING DUCTS TO COOL SUFFICIENTLY TO PREVENT PERSONAL INJURY.

1. Equipment and Materials

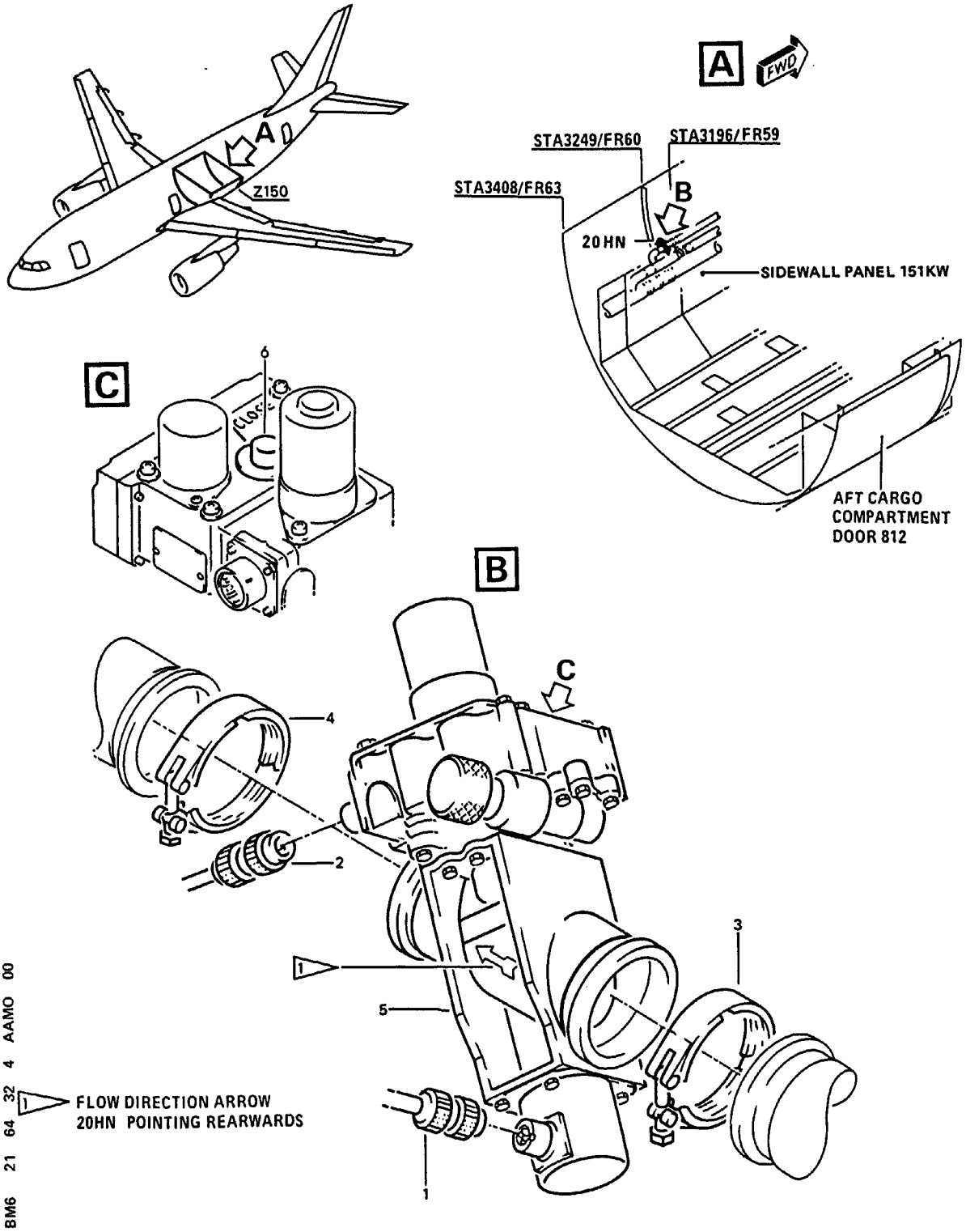
ITEM	DESIGNATION
A.	Electrical Ground Power Unit - 3-phase, 115/200V, 400 Hz
B.	Access Platforms, 2.3 m (7.5 ft.)
C.	Torque Wrench, up to 0.60 m.daN (53 lbf.in.)
D.	Blanking Plugs/Caps
E.	Circuit Breaker Safety Clips
F.	Warning Notice

Referenced Procedure

- 21-64-00, P. Block 501	Cargo Compartment Temperature Control
- 24-41-00, P. Block 301	AC External Power Control
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors

2. Procedure

(Ref. Fig. 401)



Trim Air Valve 20HN
Figure 401

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP-CARGO BULK AUTO CTL	5HN	D55
131VU	COMPT TEMP-CARGO BULK MAN CTL	4HN	D56
131VU	AIR BLEED-HOT AIR SUPPLY CTL	2HJ	G57
131VU	COMPT TEMP-HOT AIR SUPPLY WARN	1HJ	H57

(2)On COMPT TEMP panel 437VU:

(a)Make certain that PACK VALVE pushbutton switches are in OFF position.

(b)Display a warning notice prohibiting operation of the system.

(c)Release HOT AIR SUPPLY pushbutton switch 4HJ to OFF position.

(3)Position access platform.

(4)Open AFT cargo compartment door 812 and secure with safety lock (Ref. 52-30-00, P. Block 301).

(5)Remove sidewall panel 151KW.

B. Removal

(1)Disconnect electrical connectors (1) 20HN-A and (2) 20HN-B.

(2)Release clamps (3, 4) and displace along ducting.

(3)Remove trim air valve (5) 20HN.

(4)Cap electrical connectors and cover open duct ends.

C. Installation
(1)Remove blanking caps and covers, and check for correct condition of duct flanges and electrical connectors.
(2)Make certain that valve flap is closed and that the visual position indicator (6) points to CLOSE.
(3)Position trim air valve (5) 20HN making certain that flow direction arrow points rearwards and that the actuator is above valve body.
(4)Install clamps (3, 4). TORQUE to 0.50 m.daN (45 lbf.in.).
(5)Connect electrical connectors (1) 20HN-A and (2) 20HN-B.

D. Test
(1)Remove safety clips and tags and close circuit breakers 4HN, 5HN, 1HJ, 2HJ.
(2)On COMPT TEMP panel 437VU, remove warning notice.
(3)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Make certain that electronics racks ventilation is correct.
(5)Carry out system operational test (Ref. 21-64-00, P. Block 501) and make certain that trim air valve 20HN operates properly.

E. Close-Up
(1)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(2)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(3)Install sidewall panel 151KW.
(4)Remove safety lock and close AFT cargo compartment door 812 (Ref. 52-30-00, P. Block 301).
(5)Remove access platform.

TRIM AIR VALVE 20HN - DEACTIVATION/REACTIVATION

Ref. MMEL Sect. 1.21 item 23 (Trim air valve (cargo))

WARNING : ALLOW HOT AIR VALVE AND ADJOINING DUCTS TO COOL SUFFICIENTLY TO PREVENT PERSONAL INJURY.

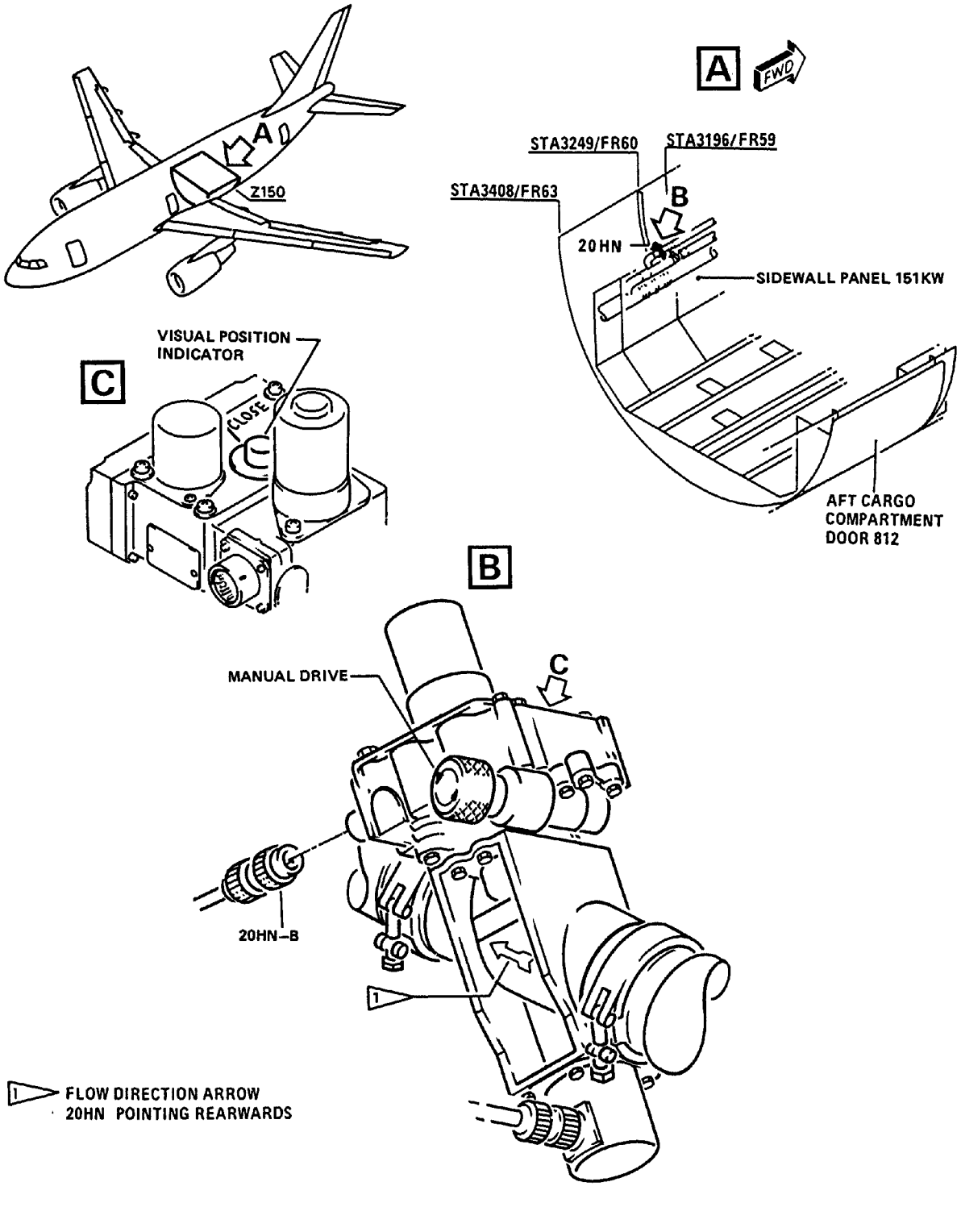
1. Deactivation

A. Reason for Job
(1)Ref. MMEL Sect. 1.21 item 23, Trim air valve may be inoperative in closed position.

B. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.3 m (7.5 ft.)
B.	Blanking Plugs/Caps
C.	Circuit Breaker Safety Clips
D.	Warning Notice
E.	Tape
Referenced Procedure	
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors

C. Procedure
(Ref. Fig. 901)



Trim Air Valve 20HN
Figure 901

(1)Job Set-Up
(a)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP-CARGO BULK AUTO CTL	5HN	D55
131VU	COMPT TEMP-CARGO BULK MAN CTL	4HN	D56
131VU	AIR BLEED-HOT AIR SUPPLY CTL	2HJ	G57
131VU	COMPT TEMP-HOT AIR SUPPLY WARN	1HJ	H57

(b)On COMPT TEMP panel 437VU:
1 Make certain that PACK VALVE pushbutton switches are released OFF.
2 Display a warning notice prohibiting operation of the system.
3 Release HOT AIR/SUPPLY pushbutton switch 4HJ to OFF position.
(c)Position access platform.
(d)Open AFT cargo compartment door 812 and secure with safety lock (Ref. 52-30-00, P. Block 301).
(e)Remove sidewall panel 151KW.

(2)Deactivation
(a)Disconnect electrical connector 20HN-B.
(b)Cap electrical connector.
(c)Stow electrical cable and connector 20HN-B and secure with tape.
(d)Move trim air valve 20HN to the fully CLOSE position by manual drive.
(e)Make certain that ciruit breakers 4HN and 5HN are left open and tagged.
(f)Close circuit breakers 2HJ and 1HJ.
(g)Remove warning notice and press HOT AIR SUPPLY and PACK VALVE pushbutton switches.
(h)Release ISOL VALVE pushbutton to OFF and display warning notice.
(3)Close-Up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Install sidewall panel 151KW.
(c)Remove safety lock and close AFT cargo compartment door 812 (Ref. 52-30-00, P. Block 301).
(d)Remove access platform.
(e)Make an entry in the aircraft technical log.

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.3 m (7.5 ft.)
B.	Circuit Breaker Safety Clips
C.	Warning Notice

Referenced Procedures

- 21-64-00, P. Block 101	Trouble Shooting Manual (TSM)
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors

B. Procedure

(1)Job Set-Up

(a)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
131VU	COMPT TEMP-CARGO BULK AUTO CTL	5HN	D55
131VU	COMPT TEMP-CARGO BULK MAN CTL	4HN	D56
131VU	AIR BLEED-HOT AIR SUPPLY CTL	2HJ	G57
131VU	COMPT TEMP-HOT AIR SUPPLY WARN	1HJ	H57

(b)On COMPT TEMP panel 437VU:

1 Make certain that PACK VALVE pushbutton switches are released OFF.

2 Display a warning notice prohibiting operation of the system.

3 Release HOT AIR/SUPPLY pushbutton switch 4HJ to OFF position.

(c)Position access platform.

(d)Open AFT cargo compartment door 812 and secure with safety lock (Ref. 52-30-00, P. Block 301).

(e)Remove sidewall panel 151KW.

(2)Reactivation
  (a)Remove blanking caps from electrical plug and receptacle.
  (b)Connect electrical connector 20HN-B.
  (c)Remove safety clips and tags and close circuit breakers 4HN, 5HN, 1HJ and 2HJ.
  (d)Carry out trouble shooting (Ref. TSM 21-64-00).
(3)Close-Up
  (a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
  (b)Install sidewall panel 151KW.
  (c)Remove safety lock and close AFT cargo compartment door 812 (Ref. 52-30-00, P. Block 301).
  (d)Remove access platform.
  (e)Clear technical log.

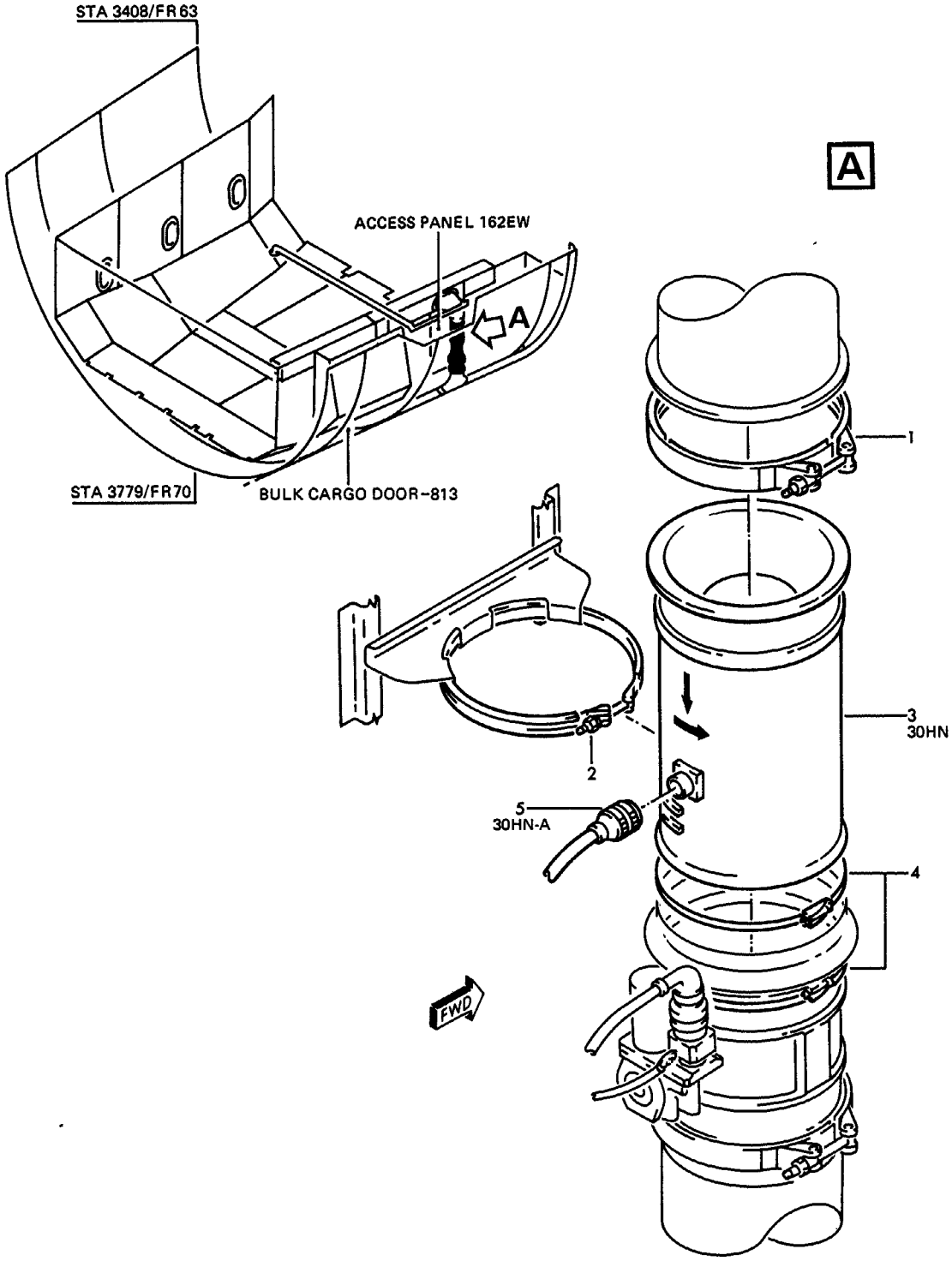
EXTRACTION FAN 30HN - REMOVAL/INSTALLATION

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Electrical Ground Power Unit - 3-Phase 115/200 V AC, 400 Hz
B.	Access Platform, 2.3 m (7.5 ft.)
C.	Torque Wrench, up to 0.850 m.daN (75 lbf.in.)
D.	Blanking Plugs/Caps/Covers
E.	Circuit Breaker Safety Clips
F.	Warning Notice
Referenced Procedure	
- 24-41-00, P. Block 301	AC External Power Control

2. Procedure
(Ref. Fig. 401)



BM6 21 64 33 4 ACMO -23

BULK Cargo Compartment Extraction Fan
Figure 401

A. Job Set-Up

(1) On COMPT TEMP panel 437VU, make certain that BULK CARGO ISOL VALVE push-button switch is released OFF and display warning notice prohibiting operation.

(2) Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP/CARGO ISOL VALVES/BULK	2HN	G28
131VU	COMPT TEMP/CARGO COMPT EXTRACT FANS/BULK	37HN	E57

(3) Position access platform and open BULK cargo compartment door 813.

(4) In BULK cargo compartment, remove access panel 162EW.

B. Removal
(1)Not applicable.
(2)Remove extraction fan 30HN.
(a)Disconnect electrical connector (5) 30HN-A.
(b)Remove clamps (1, 2).
(c)Loosen clamps (4) and remove extraction fan (3) 30HN.
(d)Cover open duct ends and cap electrical connectors.

C. Installation
(1)Not applicable.
(2)Install extraction fan 30HN.
(a)Remove blanking caps and covers and check for correct condition of duct flanges and electrical connectors.
(b)Position extraction fan (3) 30HN.
NOTE : Check for correct flow direction.
(c)Install clamps (1, 2), position clamps (4) and TORQUE clamps as follows:
1 clamp (1) 0.53 m.daN (46.91 lbf.in.)
2 clamp (2) 0.33 m.daN (29.20 lbf.in.)
3 clamps (4) 0.10 m.daN (8.85 lbf.in.)
(d)Connect electrical connector (5) 30HN-A.

D. Test
(1)Connect electrical ground power unit and energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that electronics racks ventilation is correct.
(3)Remove safety clips and tags, and close circuit breakers 2HN and 37HN.

ACTION	RESULT
1. On COMPT TEMP panel 437VU: - Press BULK CARGO ISOL VALVE pushbutton switch.	On COMPT TEMP panel 437VU: - OFF legend goes off. - for duration of isolation valve flap movement ISOL VALVE push-botton switch FAULT legend comes on and then goes off. In BULK cargo compartment: - Fan operates after isolation valve 19HN reaches full open position.
2. In BULK cargo compartment: - Check fan and duct connections for leaks.	- Leaks are not permissible.

E. Close-Up
(1)De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)In BULK cargo compartment install access panel 162EW.
(4)Close cargo compartment door 813.
(5)Remove warning notice.
(6)Remove access platform.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Valve/Actuator Assembly

A. Equipment and Materials

ITEM	DESIGNATION
A.	Electrical Ground Power Unit - 3-Phase, 115/200 V AC, 400 Hz
B.	Access Platform, 2.3 m (7.5 ft.)
C.	Torque Wrench, up to 0.60 m.daN (53 lbf.in.)
D.	Blanking Plugs/Caps
E.	Circuit Breaker Safety Clips
F.	Warning Notice

Referenced Procedure	
- 24-41-00, P. Block 301	AC External Power Control

B. Procedure

(Ref. Fig. 401)

(1)Job Set-Up

(a)Open, safety and tag the following circuit breaker:

PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP-CARGO/ISOL/VALVE-BULK	2HN	G28

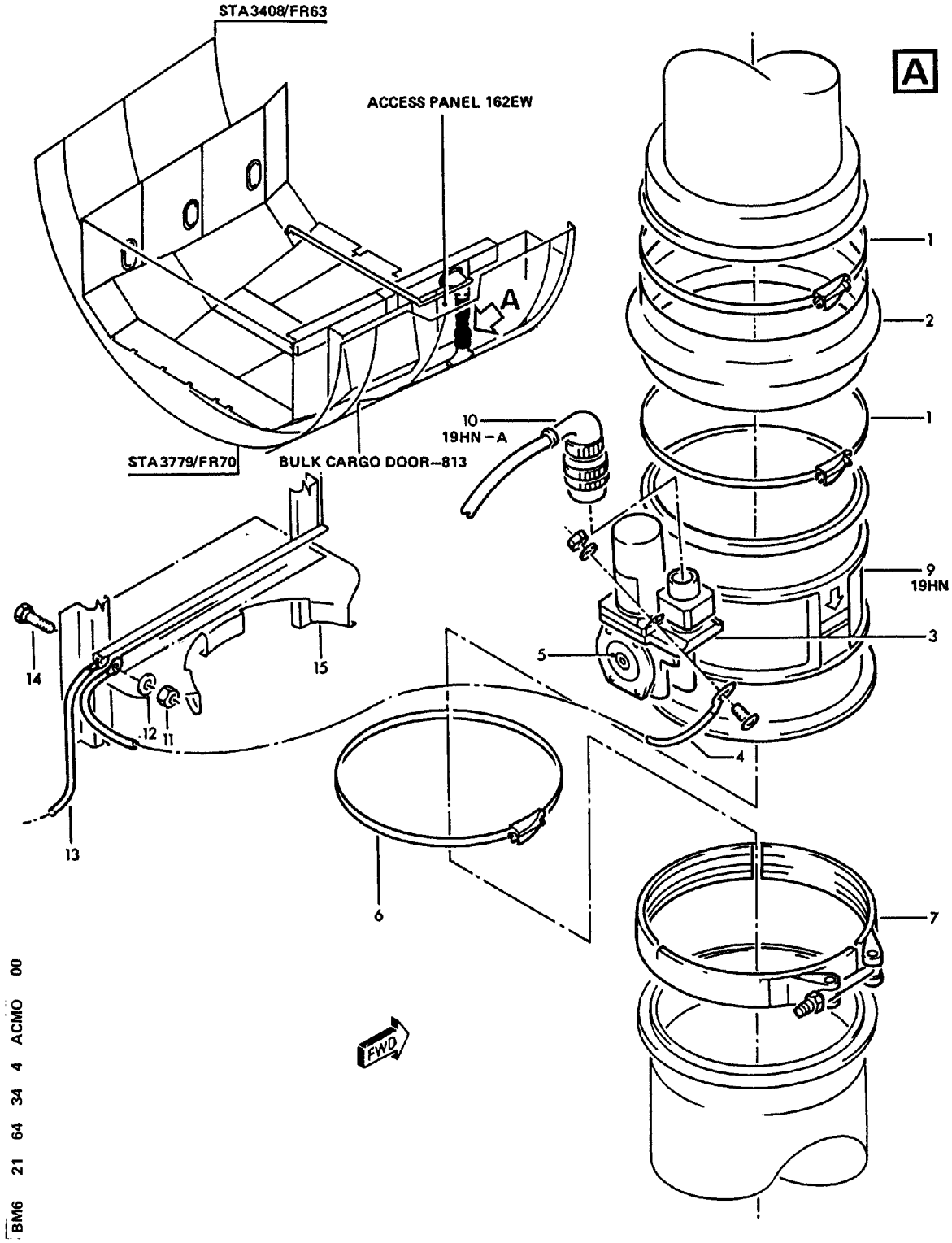
(b)On COMPT TEMP panel 437VU:

1 Make certain that BULK CARGO/ISOL VALVE pushbutton switch is released OFF and display warning notice prohibiting operation.

(c)Position access platform.

(d)Open BULK cargo compartment door 813.

(e)Remove access panel 162EW.



BULK Isolation Valve - 19HN
Figure 401

(2)Removal
  (a)Disconnect electrical connector 19HN-A (10).
  (b)Remove bonding strap (4) from actuator.
  (c)Release clamps (1) and free bellows (2) from isolation valve body (9).
  (d)Remove clamps (6).
  (e)Remove nuts (11) washers (12) bonding straps (4, 13) screws (14) and bracket (15).
  (f)Remove clamp (7) and isolation valve (9) 19HN.
  (g)Cap electrical connector and cover open duct ends.
(3)Installation
  (a)Remove blanking cap and covers.
  (b)Make certain that isolation valve flap is closed and that position indicator (5) points to 'C'.
  NOTE : Before Bronzavia SB 21-29 closed position is indicated by 'F'.
  (c)Position isolation valve (9), making certain that flow direction arrow points downwards and that actuator (3) of isolation valve faces rearward.
  (d)Install clamp (7). TORQUE to between 0.50 and 0.56 m.daN (44.25 and 49.50 lbf.in.).
  (e)Install bracket (15) screws (14) bonding straps (13,4) washers (12) and nuts (11).
  (f)Position bellows (2) and secure with clamps (1).
  (g)Secure isolation valve (9) to mount with clamp (6).
  (h)Install bonding strap (4) to actuator.
  (j)Connect electrical connector 19HN-A (10).

(4)Test
(a)Remove safety clip and tag, and close circuit breaker 2HN.
(b)Connect electrical ground power unit and energize aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Make certain that electronics racks ventilation is correct.
(d)Test operation of isolation valve 19HN.

ACTION	RESULT
1. On COMPT TEMP panel 437VU: - Make certain that BULK CARGO/ISOL VALVE pushbutton switch is released OFF. - Press BULK CARGO/ISOL VALVE pushbutton switch.	On COMPT TEMP panel 437VU: - pushbutton switch OFF/R legend is on. - pushbutton switch OFF/R legend goes off. - For duration of isolation valve flap movement, ISOL VALVE pushbutton switch FAULT legend comes on and then goes off. In BULK cargo compartment: - Isolation valve 19HN opens, indicator (5) points to '0'. - Extract fan 30HN is on.
2. In BULK cargo compartment: - Check isolation valve (9) and duct connections for leaks.	- Leaks are not permissible.

(5)Close-Up
(a)De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(b)On COMPT TEMP panel 437VU, remove warning notice.
(c)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(d)In BULK cargo compartment, install access panel 162EW.
(e)Close BULK cargo compartment door 813.
(f)Remove access platform.

2. Actuator

A. Equipment and Materials

ITEM	DESIGNATION
A.	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz
B.	Access Platform, 2.3 m (7.5 ft.)
C.	Blanking Plugs/Caps
D.	Circuit Breaker Safety Clips
E.	Warning Notice

Referenced Procedure	
- 24-41-00, P. Block 301	AC External Power Control

B. Procedure

(Ref. Fig. 402)

(1)Job Set-Up

(a)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP/CARGO ISOL VALVE/BULK	2HN	G28

(b)On COMPT TEMP panel 437VU:

1 Make certain that BULK CARGO ISOL VALVE pushbutton switch is selected OFF and display warning notice prohibiting operation.

(c)Position access platform and open BULK cargo compartment door 813.

(d)Remove access panel 162EW.

(2)Removal

(a)Disconnect and cap electrical connector (10) 19HN-A.

(b)Remove bonding strap (4).

(c)Remove clamp (11).

(d)Remove clamping flanges (12).

(e)Remove actuator (13) and secure centering bush (14).

(3)Installation

(a)Make certain that centering bush (14) is in place.

(b)Position actuator drive shaft to valve flap shaft and engage locating stud (15).

(c)Install clamping flanges (12) and clamp (11).

(d)Install bonding strap (4).

(e)Remove blanking cap and connect electrical connector (10) 19HN-A.

(4)Test

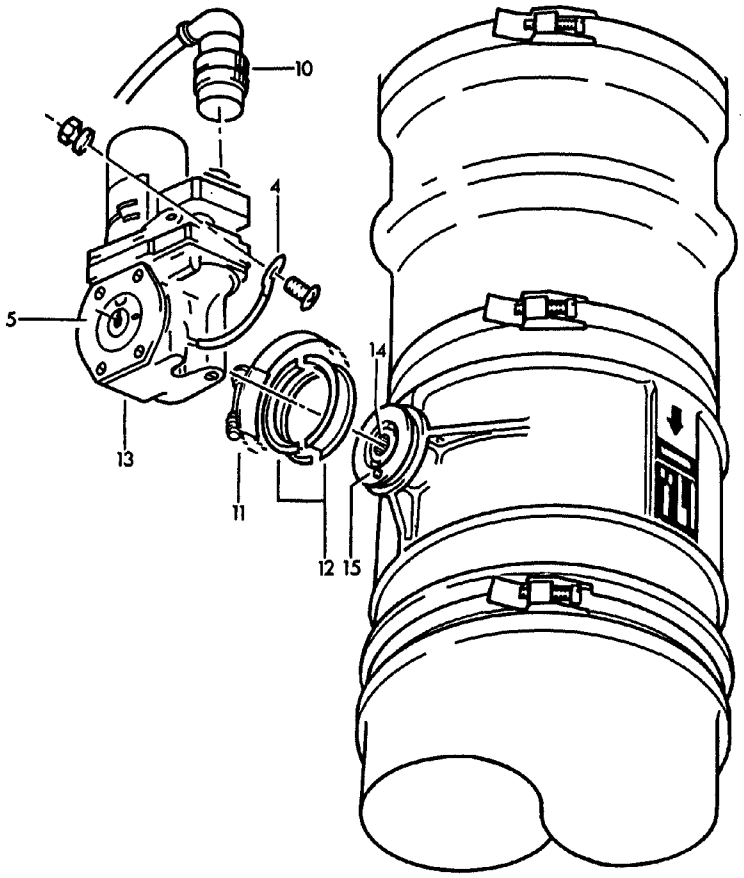
(a)Ref. paragraph 1.B.(4) above.

(5)Close-Up

(a)De-energize aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

(b)On COMPT TEMP panel 437VU, remove warning notice.

(c)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.



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Isolation Valve Actuator
Figure 402

(d)Install access panel 162EW.
(e)Close BULK cargo compartment door 813.
(f)Remove access platform.

ISOLATION VALVE 19HN - DEACTIVATION/REACTIVATION

Ref. MMEL Sect. 1.21 item 21 (ISOL VALVE)

1. Reason for Job

A. Ref. Sect. 1.21 item 21 - ISOL VALVE may be inoperative in closed position.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 2.3 m (7.5 ft.)
B.	Torque Wrench, up to 0.60 m.daN (53 lbf.in.)
C.	Blanking Plugs/Caps
D.	Circuit Breaker Safety Clips and Tags
E.	Warning Notice
F.	Tape

Referenced Procedures

- 21-64-34, P. Block 401	Isolation Valve
- 21-64-00, P. Block 101	Trouble Shooting Manual (TSM)

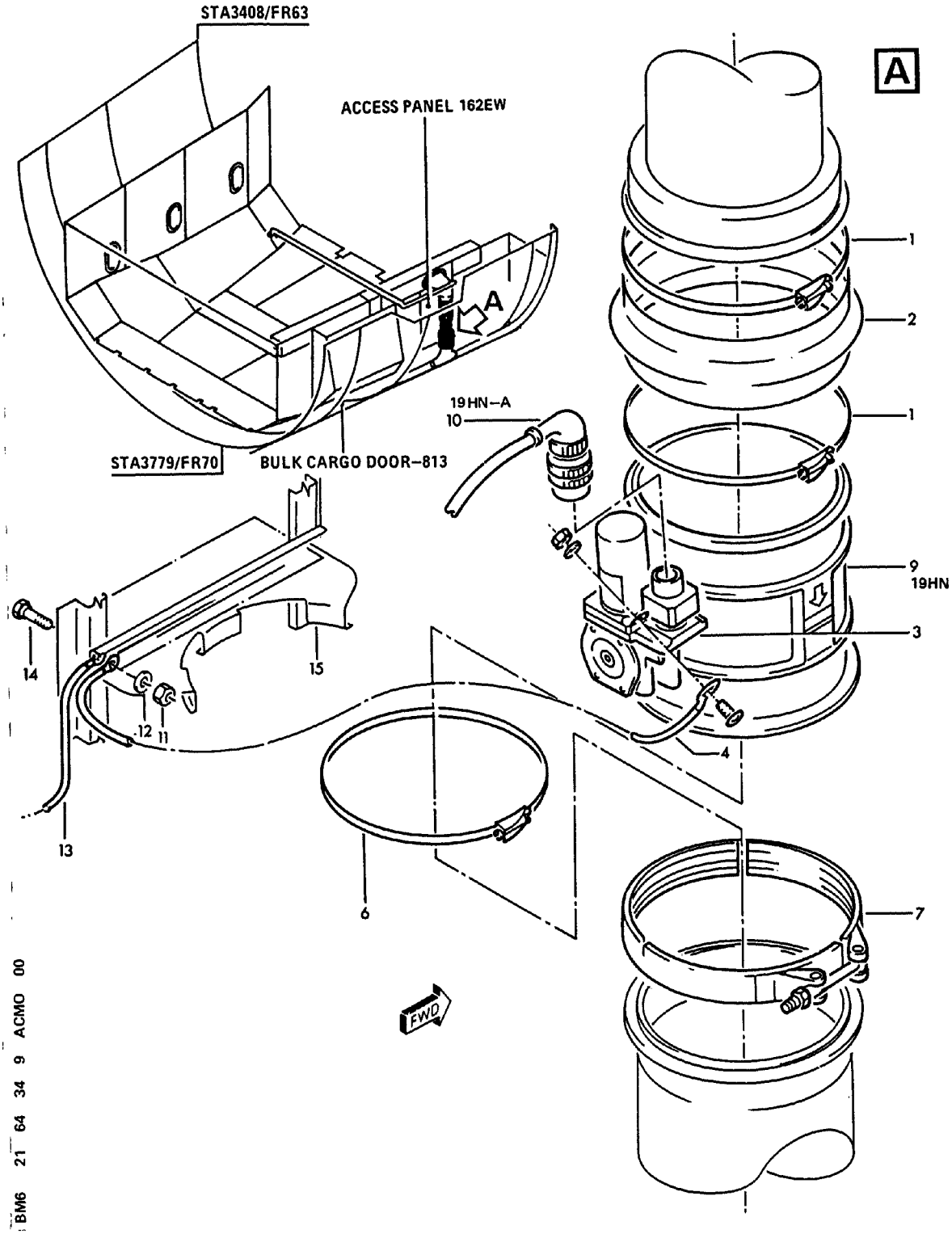
3. Procedure
(Ref. Fig. 901)

A. Job Set-Up
(1)Open, safety and tag the following circuit breaker:

PANEL	SERVICE	IDENT.	LOCATION
22VU	COMPT TEMP/CARGO ISOL VALVES/BULK	2HN	G28

(2)On COMPT TEMP panel 437VU:
(a)Make certain that BULK CARGO ISOL VALVE pushbutton switch is released OFF and display warning notice prohibiting operation.
(3)Position access platform and open BULK cargo compartment door 813.
(4)Remove access panel 162EW.

B. Deactivation
(1)Remove isolation valve
(a)Disconnect electrical connector (10) 19HN-A.
(b)Remove bonding strap (4) from actuator.
(c)Release clamps (1) and free bellows (2) from valve body.
(d)Remove clamps (6).
(e)Remove nuts (11) washers (12) bonding straps (4, 13) screws (14) and bracket (15).
(f)Remove clamp (7) and isolation valve (9) 19HN.
(g)Cap electrical connector and cover open duct ends.
(h)Secure electrical connector (10) 19HN-A with tape to adjacent structure.



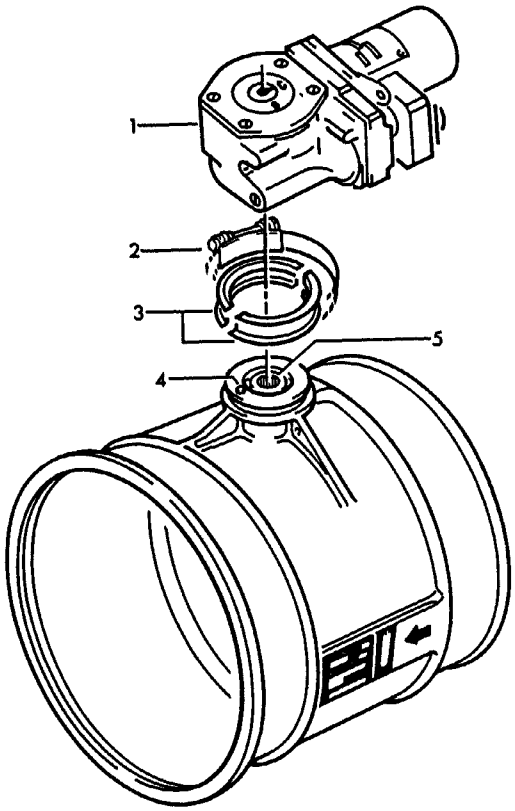
BULK Isolation Valve - 19HN
Figure 901

(2)Remove isolation valve actuator
(Ref. Fig. 902)
(a)Remove clamp (2).
(b)Remove clamping flanges (3) and actuator (1).
(c)Remove and discard locating stud (4).
(d)Close valve manually.
(e)Make certain that centering bush (5) is in place.
(f)Secure valve flap position by installing actuator (1) with clamping flanges (3) and clamp (2).

(3)Install isolation valve
(a)Remove covers.
(b)Position isolation valve, making certain that flow direction arrow points downwards and that actuator (3) of valve 19HN faces rearward.
(c)Install clamp (7). TORQUE to between 0.50 and 0.56 m.daN (44.25 and 49.56 lbf.in.).
(d)Install bracket (15) screws (14) bonding straps (13, 4) washers (12) and nuts (11).
(e)Position bellows (2) and secure with clamps (1).
(f)Secure isolation valve to mount with clamp (6).
(g)Install and secure bonding strap (4) to actuator.

(4)Close-Up
(a)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(b)Install access panel 162EW.
(c)Close BULK cargo compartment door 813.
(d)Remove access platform.
(e)Make certain that circuit breaker 2HN is left open, safetied and tagged.
(f)On COMPT TEMP panel 437VU, remove warning notice.
(g)Make an entry in the aircraft technical log.

C. Reactivation
(1)Replace isolation valve (Ref. 21-64-34, P. Block 401).
(2)Refer to TSM 21-64-00, P. Block 101.



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Isolation Valve - Actuator
Figure 902

1. General

Ozone reducers are installed in the air distribution system, upstream of the refrigeration unit packs, in order to reduce ozone concentrations in the cabin (Ref. 21-71-00, P. Block 1).

OZONE REDUCING SYSTEM - DESCRIPTION AND OPERATION

1. General

The purpose of the ozone reducing system is to avoid ozone concentration in the cabin.

2. Component Location

(Ref. Fig. 001)

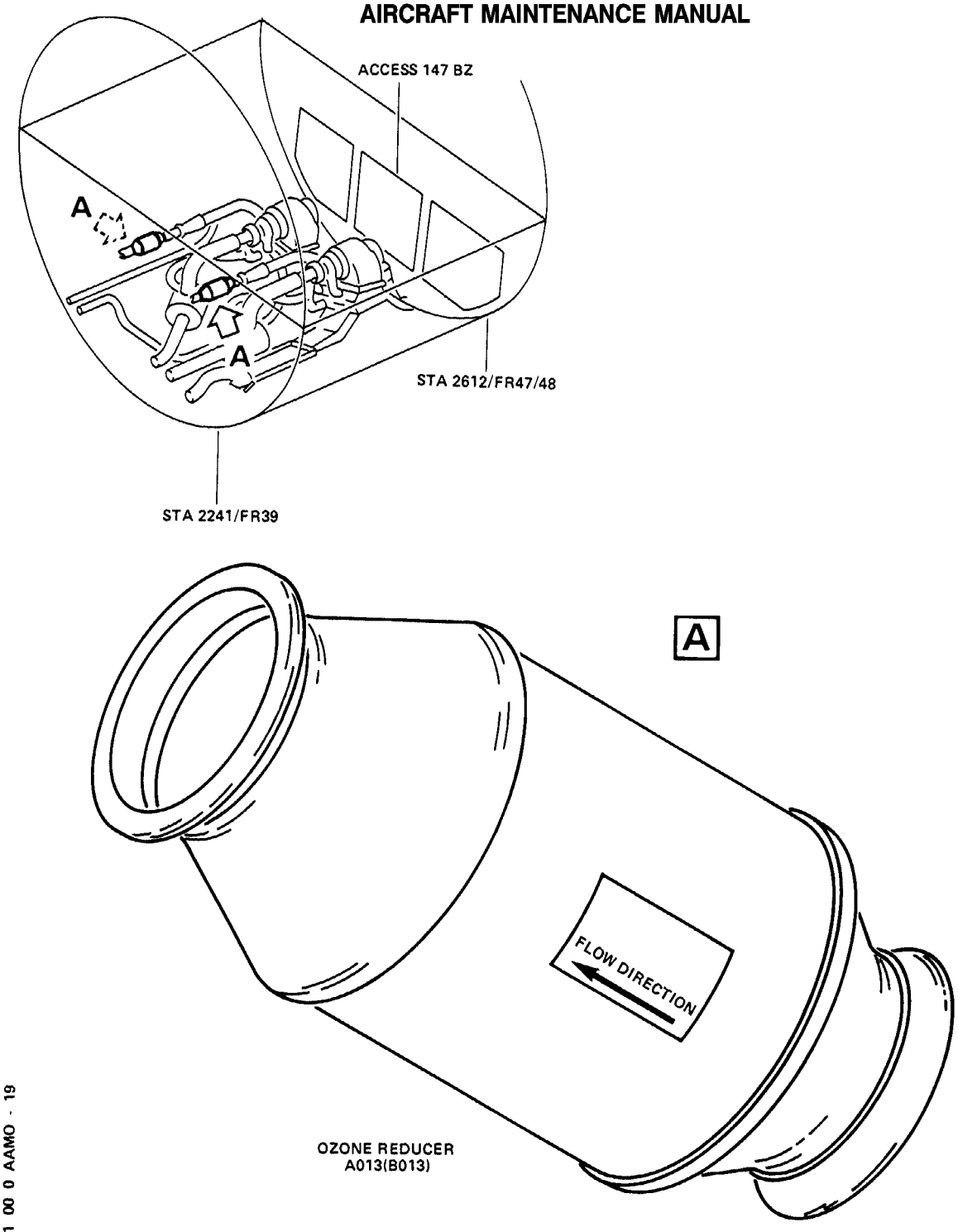
FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
A013	OZONE REDUCER		143	147BZ	21-71-11
B013	OZONE REDUCER		144	147BZ	21-71-11

3. Description

(Ref. Fig. 002)

An ozone reducer is installed at the air inlet of each pack flow control valve, upstream of the refrigeration unit packs.

It is a honeycomb monolithic catalyst.



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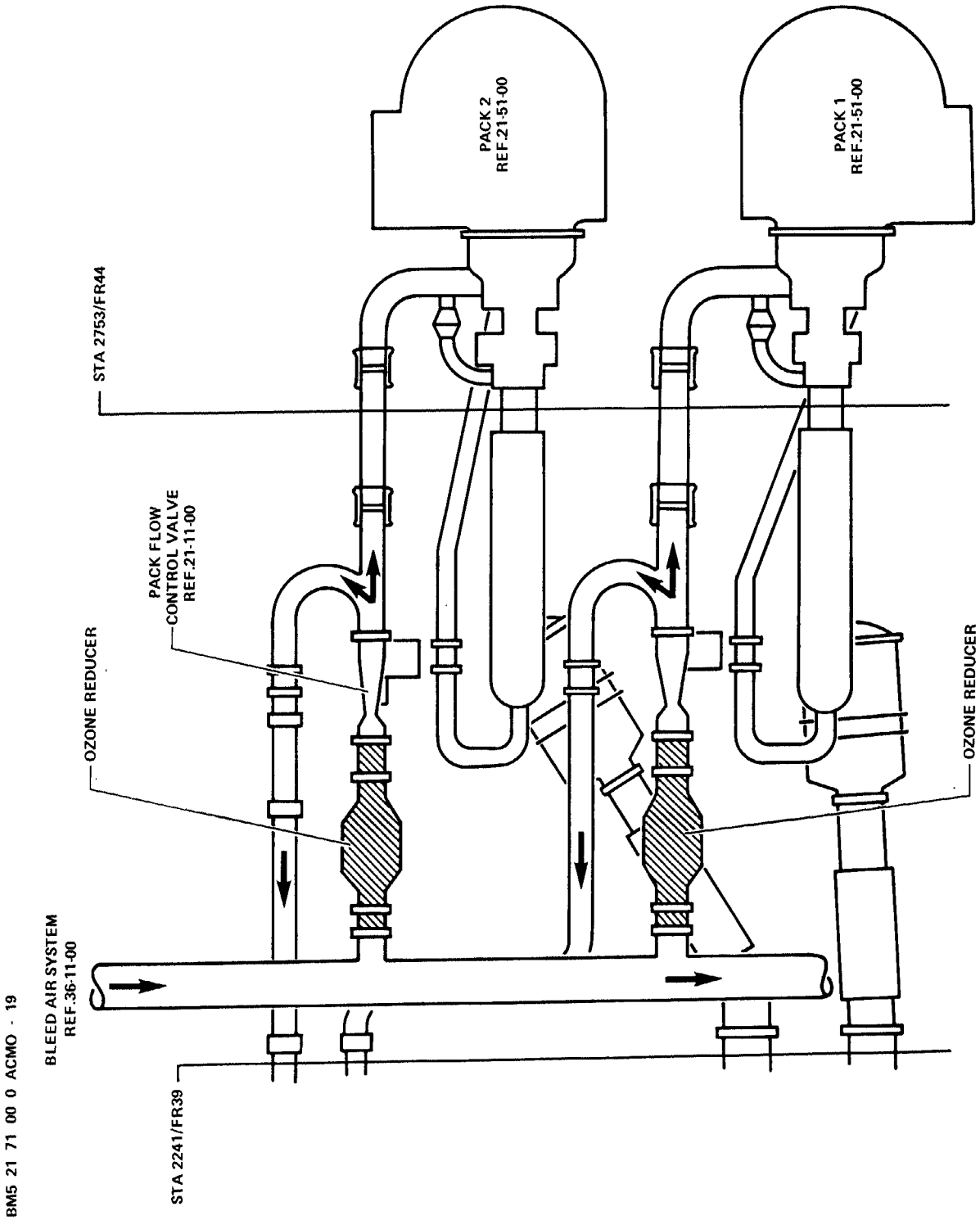
Ozone Reducer - Location
Figure 001



Ozone Reducer - Airflow Diagram
Figure 002

OZONE REDUCER 21A013 (21B013) - REMOVAL/INSTALLATION

WARNING : BEFORE UNDERTAKING MAINTENANCE OPERATION ON THE AIR CONDITIONING SYSTEM, MAKE CERTAIN THE PNEUMATIC SYSTEM IS DEPRESSURIZED.

NOTE : Removal/installation procedures of ozone reducer 21A013 and 21B013 located in the air conditioning compartment are identical.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.6 m (8 ft. 6 in.)
B.	Blanking Plugs/Caps
C.	Warning Notices
Referenced Procedure - 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

WARNING : DISPLAY WARNING NOTICES PROHIBITING PRESSURIZATION OF THE PNEUMATIC SYSTEM.

(1)Position access platform.
(2)Open main gear main door (Ref. 32-12-11, P. Block 301).
R (3)Remove air conditioning compartment access door 147BZ.

B. Removal

(1)Remove clamps (2) and (4).
(2)Remove ozone reducer (3).
(3)Cap open ends of ducts (1) and (5).

C. Installation

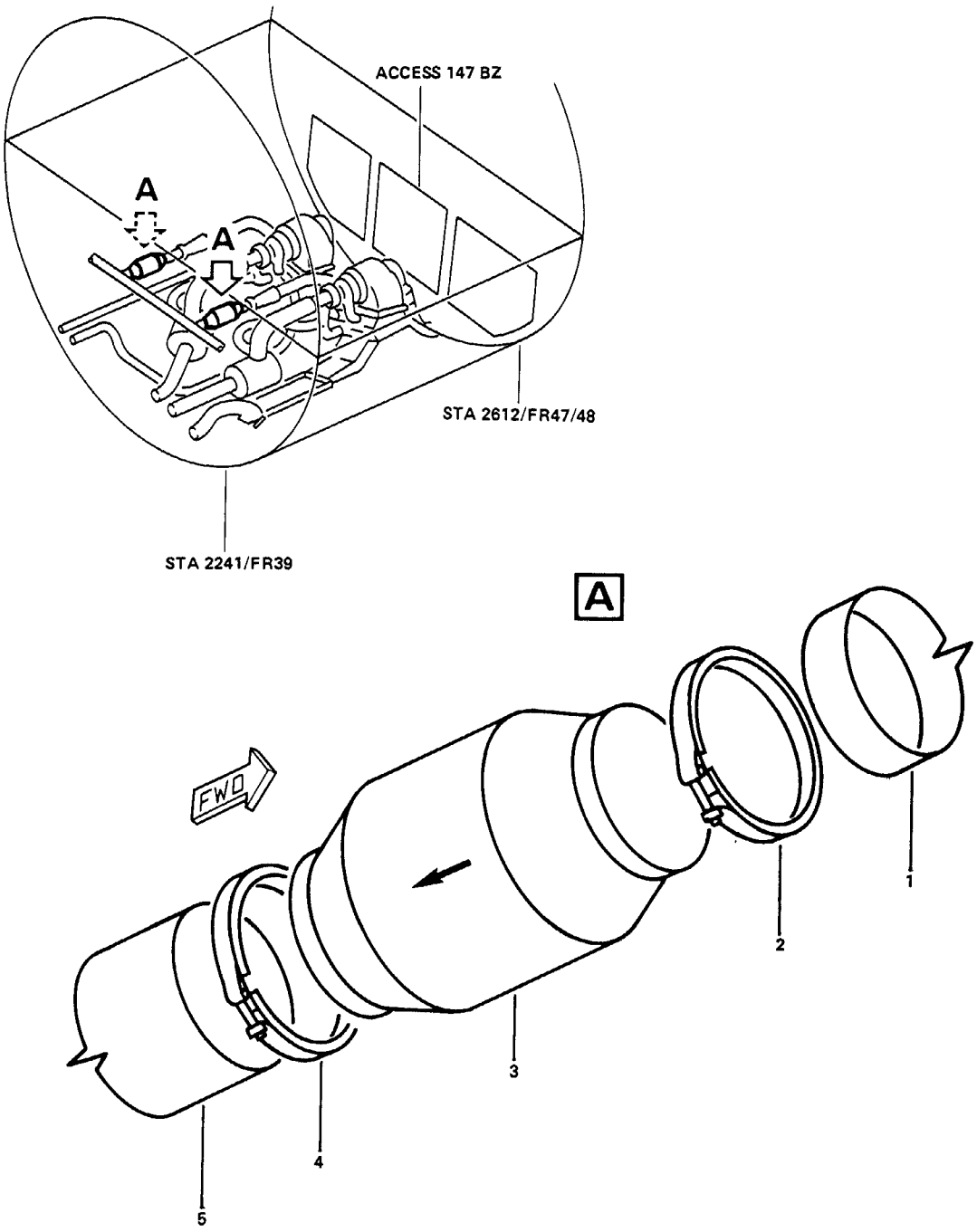
(1)Remove blanking caps and check for correct condition of flanges of ducts (1) and (5).
R (2)Clean the component interface and/or the adjacent area.
R (3)Install ozone reducer (3) between duct (1) and (5), with arrow indicating air flow direction pointing aft.
R (4)Install and tighten clamps (2) and (4). TORQUE to the value given on the clamps.

D. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/PANELS AT FR47.

(2)Install access door 147BZ.
(3)Close main gear main door (Ref. 32-12-11, P. Block 301).
(4)Remove access platform.
(5)Remove warning notices.



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Ozone Reducer 21A013 (21B013)
Figure 401

OZONE REDUCER 21A013 (21B013) - INSPECTION/CHECK

1. Reason for the Job
   Remove ozone reducer for efficiency check in workshop.

2. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 21-71-11, P. Block 401	Ozone Reducer 21A013 (21B013)

3. Procedure

A. Job Set-Up
(1)Remove the ozone reducer (Ref. 21-71-11, P. Block 401).

B. Check
(1)Send the ozone reducer for efficiency check to the vendor.

C. Close-Up
(1)Install a new ozone reducer (Ref. 21-71-11, P. Block 401).